Dell Command Line Reference Guide for the S6000 System

9.5(0.1)

Notes, Cautions, and Warnings

NOTE: A NOTE indicates important information that helps you make better use of your computer.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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1

About this Guide

This book provides information about the Dell Networking OS command line interface (CLI).

This book also includes information about the protocols and features found in Dell S6000 platform.

References

For more information about your system, refer to the following documents:

- *Dell Networking OS Configuration Guides*
- *Installation and Maintenance Guides*
- *Release Notes*

Objectives

This book is intended as a reference guide for the Dell Networking OS CLI commands, with detailed syntax statements, along with usage information and sample output.

NOTE: For more information about when to use the CLI commands, refer to the *Dell Networking OS Configuration Guide* for your system.

Audience

This book is intended for system administrators who are responsible for configuring or maintaining networks. This guide assumes that you are knowledgeable in Layer 2 and Layer 3 networking technologies.

Conventions

This book uses the following conventions to describe command syntax.

`Keyword`	Keywords are in Courier font and must be entered in the CLI as listed.
parameter	Parameters are in italics and require a number or word to be entered in the CLI.
{X}	Keywords and parameters within braces must be entered in the CLI.

[X]	Keywords and parameters within brackets are optional.
x|y	Keywords and parameters separated by a bar require you to choose one option.
x||y	Keywords and parameters separated by a double bar allows you to choose any or all of the options.

Information Icons

This book uses the following information symbols:

NOTE: The Note icon signals important operational information.

CAUTION: The Caution icon signals information about situations that could result in equipment damage or loss of data.

WARNING: The Warning icon signals information about hardware handling that could result in injury.

2

CLI Basics

This chapter describes the command line interface (CLI) structure and command modes. The Dell Networking operating software commands are in a text-based interface that allows you to use the launch commands, change command modes, and configure interfaces and protocols.

Accessing the Command Line

When the system boots successfully, you are positioned on the command line in EXEC mode and not prompted to log in. You can access the commands through a serial console port or a Telnet session. When you Telnet into the switch, you are prompted to enter a login name and password.

Example

```
telnet 172.31.1.53
Trying 172.31.1.53...
Connected to 172.31.1.53.
Escape character is '^]'.
Login: username
Password: Dell>
```

After you log in to the switch, the prompt provides you with the current command-level information. For example:

Prompt	CLI Command Mode
Dell>	EXEC
Dell#	EXEC Privilege
Dell(conf)#	CONFIGURATION

NOTE: For a list of all the command mode prompts, refer to the Command Modes section.

Multiple Configuration Users

When a user enters CONFIGURATION mode and another user is already in CONFIGURATION mode, the Dell Networking operating software generates an alert warning message similar to the following:

```
Dell#conf

% Warning: The following users are currently configuring the system:

User "" on line console0
User "admin" on line vty0 ( 123.12.1.123 )
User "admin" on line vty1 ( 123.12.1.123 )
User "Irene" on line vty3 ( 123.12.1.321 )
Dell#conf
```

When another user enters CONFIGURATION mode, Dell Networking OS sends a message similar to the following:

```
% Warning: User "admin" on line vty2 "172.16.1.210" is in configuration
```

In this case, the user is “admin” on vty2.

Obtaining Help

As soon as you are in a command mode there are several ways to access help.

To obtain a list of keywords at any command mode:	Type a `?` at the prompt or after a keyword. There must always be a space before the `?`.
To obtain a list of keywords with a brief functional description:	Type `help` at the prompt.
To obtain a list of available options:	Type a keyword and then type a space and a `?`.
To obtain a list of partial keywords using a partial keyword:	Type a partial keyword and then type a `?`.

Example

The following is an example of typing `ip ?` at the prompt:

```
Dell(conf)#ip ?
access-list        Named access-list
as-path            BGP autonomous system path filter
community-list     Add a community list entry
domain-list        Domain name to complete unqualified host
name
domain-lookup      Enable IP Domain Name System hostname
translation
domain-name        Define the default domain name
fib                FIB configuration commands
ftp                FTP configuration commands
host               Add an entry to the ip hostname table
max-frag-count     Max. fragmented packets allowed in IP re-
assembly
multicast-routing  Enable IP multicast forwarding
name-server        Specify address of name server to use
pim Protocol       Independent Multicast
prefix-list        Build a prefix list
radius             Interface configuration for RADIUS
redirect-list      Named redirect-list
route              Establish static routes
scp                SCP configuration commands
source-route       Process packets with source routing header
options
ssh                SSH configuration commands
```

```
tacacs              Interface configuration for TACACS+
telnet              Specify telnet options
tftp                TFTP configuration commands
trace-group         Named trace-list
trace-list          Named trace-list
Dell(conf)#ip
```

When entering commands, you can take advantage of the following timesaving features:

- The commands are not case-sensitive.
- You can enter partial (truncated) command keywords. For example, you can enter `interface teng 0/0` for the `interface tengigabitethernet 0/0` command.
- To complete keywords in commands, use the TAB key.
- To display the last enabled command, use the up Arrow key.
- Use either the Backspace key or Delete key to erase the previous character.
- To navigate left or right in the Dell Networking OS command line, use the left and right Arrow keys.

The shortcut key combinations at the Dell Networking OS command line are as follows:

Key Combination	Action
CNTL-A	Moves the cursor to the beginning of the command line.
CNTL-B	Moves the cursor back one character.
CNTL-D	Deletes the character at the cursor.
CNTL-E	Moves the cursor to the end of the line.
CNTL-F	Moves the cursor forward one character.
CNTL-I	Completes a keyword.
CNTL-K	Deletes all the characters from the cursor to the end of the command line.
CNTL-L	Re-enters the previous command.
CNTL-N	Returns to the more recent commands in the history buffer after recalling commands with Ctrl-P or the up Arrow key.
CNTL-P	Recalls commands, beginning with the last command.
CNTL-R	Re-enters the previous command.
CNTL-U	Deletes the line.
CNTL-W	Deletes the previous word.
CNTL-X	Deletes the line.
CNTL-Z	Ends continuous scrolling of the command outputs.
Esc B	Moves the cursor back one word.
Esc F	Moves the cursor forward one word.
Esc D	Deletes all the characters from the cursor to the end of the word.

Navigating the CLI

Dell Networking OS displays a CLI prompt comprised of the host name and CLI mode.

- Host name is the initial part of the prompt and is “Dell” by default. You can change the host name with the `hostname` command.
- CLI mode is the second part of the prompt and reflects the current CLI mode. For a list of the Dell Networking OS command modes, refer to the command mode list in the Accessing the Command Line section.

The CLI prompt changes as you move up and down the levels of the command structure. Starting with CONFIGURATION mode, the command prompt adds modifiers to further identify the mode. For more information about command modes, refer to the Command Modes section.

Using the Keyword no Command

To disable, delete or return to default values, use the `no` form of the commands.

For most commands, if you type the keyword `no` in front of the command, you disable that command or delete it from the running configuration. In this guide, the `no` form of the command is described in the Syntax portion of the command description.

Filtering show Commands

To find specific information, display certain information only or begin the command output at the first instance of a regular expression or phrase, you can filter the display output of a `show` command.

When you execute a `show` command, and then enter a pipe (|), one of the following parameters, and a regular expression, the resulting output either excludes or includes those parameters.

NOTE: Dell Networking OS accepts a space before or after the pipe, no space before or after the pipe, or any combination. For example: `Dell#command | grep gigabit |except regular-expression | find regular-expression`

`display`	displays additional configuration information
`except`	displays only the text that does not match the pattern (or regular expression)
`find`	searches for the first occurrence of a pattern
`grep`	displays text that matches a pattern. The `grep` command option has an ignore-case suboption that makes the search case-insensitive. For example, the commands: **`show run	grep Ethernet`** — returns a search result with instances containing a capitalized “Ethernet,” such as `interface GigabitEthernet 0/0`

show run | grep ethernet	does not return the previous search result because it only searches for instances containing a noncapitalized “ethernet”
show run | grep Ethernet ignore-case	returns instances containing both “Ethernet” and “ethernet”

no-more	does not paginate the display output
save	copies the output to a file for future use

Displaying All Output

To display the output all at once (not one screen at a time), use the `no-more` option after the pipe. This operation is similar to the `terminal length screen-length` command except that the `no-more` option affects the output of just the specified command. For example: `Dell#show running-config| no-more`.

Filtering the Command Output Multiple Times

You can filter a single command output multiple times. To filter a command output multiple times, place the `save` option as the last filter. For example: `Dell# command | grep regular-expression | except regular-expression | grep other-regular-expression | find regular-expression | no-more | save`.

Enabling Software Features on Devices Using a Command Option

This capability to activate software applications or components on a device using a command is supported on the S4810, S4820T, and S6000, platforms.

Starting with Release 9.4(0.0), you can enable or disable specific software functionalities or applications that need to run on a device by using a command attribute in the CLI interface. This capability enables effective, streamlined management and administration of applications and utilities that run on a device. You can employ this capability to perform an on-demand activation or turn-off of a software component or protocol. A feature configuration file that is generated for each image contains feature names denotes whether this enabling or disabling method is available for such features. In 9.4(0.0), you can enable or disable the VRF application globally across the system by using this capability.

You can activate VRF application on a device by using the `feature vrf` command in CONFIGURATION mode.

NOTE: The `no feature vrf` command is not supported on any of the platforms.

To enable the VRF feature and cause all VRF-related commands to be available or viewable in the CLI interface, use the following command. You must enable the VRF feature before you can configure its related attributes.

```
Dell(conf)# feature vrf
```

Based on whether VRF feature is identified as supported in the Feature Configuration file, configuration command feature vrf becomes available for usage. This command will be stored in running-configuration and will precede all other VRF-related configurations.

NOTE: The MXL and Z9000 platforms currently do not support VRF. These platforms support only the management and default VRFs, which are available by default. As a result, the **feature vrf** command is not available for these platforms.

To display the state of Dell Networking OS features:

```
Dell#show feature
```

Example of show feature output

For a particular target where VRF is enabled, the show output is similar to the following:

```
Feature State
------------------------------
VRF        enabled
```

feature vrf

Enable the VRF application on a device. After you enable this module, you cannot deactivate it.

S6000

Syntax	`feature vrf`
Defaults	Disabled
Command Modes	CONFIGURATION
Command History	**Version 9.4(0.0)** Introduced on the S4810, S4820T, and S6000.
Usage Information	You can activate VRF application on a device by using the `feature vrf` command in CONFIGURATION mode. The `no feature vrf` command is not supported on any of the platforms.

show feature

Verify the status of software applications, such as VRF, that are activated and running on a device.

S6000

Syntax	`show feature`
Command Modes	EXEC EXEC Privilege
Command History	**Version 9.4(0.0)** Introduced on the S4810, S4820T, and S6000.

Usage Information	You can activate VRF application on a device by using the `feature vrf` command in CONFIGURATION mode. The `no feature vrf` command is not supported on any of the platforms.

Example

```
Dell#show feature
Feature State
------------------------------
VRF        enabled
```

Command Modes

To navigate and launch various CLI modes, use specific commands. Navigation to these modes is described in the following sections.

BGP ADDRESS-FAMILY Mode

To enable or configure IPv4 for BGP, use BGP ADDRESS-FAMILY mode. For more information, refer to Border Gateway Protocol IPv4 (BGPv4).

To enter BGP ADDRESS-FAMILY mode:

1. Verify that you are logged in to ROUTER BGP mode.
2. Enter the command `address-family`
3. Enter the protocol type.
    - For IPv4, enter `ipv4 multicast`. The prompt changes to include (conf-router_bgp_af) for IPv4.

CLASS-MAP Mode

To create or configure a class map, use CLASS-MAP mode. For more information, refer to Policy-Based QoS Commands.

To enter CLASS-MAP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `class-map` command then enter the class map name. The prompt changes to include (config-class-map).

You can return to CONFIGURATION mode by using the `exit` command.

CONFIGURATION Mode

In EXEC Privilege mode, use the `configure` command to enter CONFIGURATION mode and configure routing protocols and access interfaces.

To enter CONFIGURATION mode:

1. Verify that you are logged in to EXEC Privilege mode.
2. Enter the `configure` command. The prompt changes to include (conf).

From this mode, you can enter INTERFACE mode by using the `interface` command.

CONTROL-PLANE Mode

To manage control-plane traffic, use CONTROL-PLANE mode. For more information, refer to Control Plane Policing (CoPP).

To enter CONTROL-PLANE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `control-plane-cpuqos` command. The prompt changes to include (conf-control-cpuqos).

You can return to CONFIGURATION mode by using the `exit` command.

DHCP Mode

To enable and configure Dynamic Host Configuration Protocol (DHCP), use DHCP mode. For more information, refer to Dynamic Host Configuration Protocol (DHCP).

To enter DHCP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip dhcp server` command. The prompt changes to include (config-dhcp).

You can return to CONFIGURATION mode by using the `exit` command.

DHCP POOL Mode

To create an address pool, use DHCP POOL mode. For more information, refer to Dynamic Host Configuration Protocol (DHCP).

To enter DHCP POOL mode:

1. Verify that you are logged in to DHCP mode.
2. Enter the `pool` command then the pool name. The prompt changes to include (config-dhcp-*pool-name*).

You can return to DHCP mode by using the `exit` command.

ECMP GROUP Mode

To enable or configure traffic distribution monitoring on an ECMP link bundle, use ECMP GROUP mode. For more information, refer to ecmp_overview.

To enter ECMP GROUP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ecmp-group` command then enter the ECMP group ID. The prompt changes to include (conf-ecmp-group-*ecmp-group-id*).

You can return to CONFIGURATION mode by using the `exit` command.

EIS Mode

To enable or configure Egress Interface Selection (EIS), use EIS mode.

To enter EIS mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `management egress-interface-selection` command. The prompt changes to include (conf-mgmt-eis).

You can return to CONFIGURATION mode by using the `exit` command.

EXEC Mode

When you initially log in to the switch, by default, you are logged in to EXEC mode. This mode allows you to view settings and enter EXEC Privilege mode, which is used to configure the device.

When you are in EXEC mode, the > prompt is displayed following the host name prompt, which is "Dell" by default. You can change the host name prompt using the `hostname` command.

NOTE: Each mode prompt is preceded by the host name.

EXEC Privilege Mode

The `enable` command accesses EXEC Privilege mode. If an administrator has configured an "Enable" password, you are prompted to enter it.

EXEC Privilege mode allows you to access all the commands accessible in EXEC mode, plus other commands, such as to clear address resolution protocol (ARP) entries and IP addresses. In addition, you can access CONFIGURATION mode to configure interfaces, routes and protocols on the switch. While you are logged in to EXEC Privilege mode, the # prompt is displayed.

EXTENDED COMMUNITY LIST Mode

To enable and configure a BGP extended community, use EXTENDED COMMUNITY LIST mode.

To enter EXTENDED COMMUNITY LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip extcommunity-list` command then a community list name. The prompt changes to include (conf-ext-community-list).

You can return to CONFIGURATION mode by using the `exit` command.

FRRP Mode

To enable or configure Force10 Resilient Ring Protocol (FRRP), use FRRP mode. For more information, refer to Force10 Resilient Ring Protocol (FRRP).

To enter FRRP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol frrp` command then the ring ID. The prompt changes to include (conf-frrp-*ring-id*).

You can return to CONFIGURATION mode by using the `exit` command.

INTERFACE Mode

Use INTERFACE mode to configure interfaces or IP services on those interfaces. An interface can be physical (for example, a Gigabit Ethernet port) or virtual (for example, the Null interface).

To enter INTERFACE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `interface` command and then enter an interface type and interface number that is available on the switch.

The prompt changes to include the designated interface and slot/port number. For example:

Prompt	Interface Type
Dell(conf-if)#	INTERFACE mode
Dell(conf-if-gi-0/0)#	Gigabit Ethernet interface then the slot/port information
Dell(conf-if-te-0/0)#	Ten-Gigabit Ethernet interface then slot/port information
Dell(conf-if-fo-0/0)#	Forty-Gigabit Ethernet interface then slot/port information
Dell(conf-if-lo-0)#	Loopback interface number
Dell(conf-if-nu-0)#	Null Interface then zero
Dell(conf-if-po-0)#	Port-channel interface number
Dell(conf-if-vl-0)#	VLAN Interface then VLAN number (range 1–4094)
Dell(conf-if-ma-0/0)#	Management Ethernet interface then slot/port information
Dell(conf-if-tu-0)#	Tunnel interface then tunnel ID.
Dell(conf-if-range)#	Designated interface range (used for bulk configuration).

IP ACCESS LIST Mode

To enter IP ACCESS LIST mode and configure either standard or extended access control lists (ACLs), use the `ip access-list standard` or `ip access-list extended` command.

To enter IP ACCESS LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `ip access-list standard` or `ip access-list extended` command. Include a name for the ACL. The prompt changes to include (conf-std-nacl) or (conf-ext-nacl).

You can return to CONFIGURATION mode by using the `exit` command.

ISIS ADDRESS-FAMILY Mode

To enable or configure IPv6 for ISIS, use ISIS ADDRESS-FAMILY mode. For more information, refer to Intermediate System to Intermediate System (IS-IS).

To enter ISIS ADDRESS-FAMILY mode:

1. Verify that you are logged in to ROUTER ISIS mode.
2. Enter the command `address-family ipv6 unicast`. The prompt changes to include (conf-router_isis-af_ipv6).

LLDP Mode

To enable and configure Link Layer Discovery Protocol (LLDP), use LLDP mode. For more information, refer to Link Layer Discovery Protocol (LLDP).

To enter LLDP mode:

1. To enable LLDP globally, verify that you are logged in to CONFIGURATION mode. To enable LLDP on an interface, verify that you are logged in to INTERFACE mode.
2. Enter the `protocol lldp` command. The prompt changes to include (conf-lldp) or (conf-if-*interface*-lldp).

LLDP MANAGEMENT INTERFACE Mode

To enable and configure Link Layer Discovery Protocol (LLDP) on management interfaces, use LLDP MANAGEMENT INTERFACE mode.

To enter LLDP MANAGEMENT INTERFACE mode:

1. Verify that you are logged in to LLDP mode.
2. Enter the `management-interface` command. The prompt changes to include (conf-lldp-mgmtIf).

LINE Mode

To configure the console or virtual terminal parameters, use LINE mode.

To enter LINE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `line` command. Include the keywords `console` or `vty` and their line number available on the switch. The prompt changes to include (config-line-console) or (config-line-vty).

You can exit this mode by using the `exit` command.

MAC ACCESS LIST Mode

To enter MAC ACCESS LIST mode and configure either standard or extended access control lists (ACLs), use the `mac access-list standard` or `mac access-list extended` command.

To enter MAC ACCESS LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `mac access-list standard` or `mac access-list extended` command. Include a name for the ACL. The prompt changes to include (conf-std-macl) or (conf-ext-macl).

You can return to CONFIGURATION mode by using the `exit` command.

MONITOR SESSION Mode

To enable and configure a traffic monitoring session using port monitoring, use MONITOR SESSION mode. For more information, refer to Port Monitoring.

To enter MONITOR SESSION mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `monitor session` command then the session ID. The prompt changes to include (conf-mon-sess-*sessionID*).

MULTIPLE SPANNING TREE (MSTP) Mode

To enable and configure MSTP, use MULTIPLE SPANNING TREE mode. For more information, refer to Multiple Spanning Tree Protocol (MSTP).

To enter MULTIPLE SPANNING TREE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol spanning-tree mstp` command. The prompt changes to include (conf-mstp).

You can return to CONFIGURATION mode by using the `exit` command.

OPENFLOW INSTANCE Mode

To enable and configure OpenFlow instances, use OPENFLOW INSTANCE mode.

To enter OPENFLOW INSTANCE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `openflow of-instance` command then the OpenFlow ID number of the instance you want to create or configure. The prompt changes to include (conf-of-instance *of-id*).

You can return to the CONFIGURATION mode by entering the exit command.

Per-VLAN SPANNING TREE (PVST+) Plus Mode

To enable and configure the Per-VLAN Spanning Tree (PVST+) protocol, use PVST+ mode. For more information, refer to Per-VLAN Spanning Tree Plus (PVST+).

NOTE: The protocol name is PVST+, but the plus sign is dropped at the CLI prompt.

To enter PVST+ mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol spanning-tree pvst` command. The prompt changes to include (conf-pvst).

You can return to CONFIGURATION mode by using the `exit` command.

PORT-CHANNEL FAILOVER-GROUP Mode

To configure shared LAG state tracking, use PORT-CHANNEL FAILOVER-GROUP mode. For more information, refer to Port Channel Commands.

To enter PORT-CHANNEL FAILOVER-GROUP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `port-channel failover-group` command. The prompt changes to include (conf-po-failover-grp).

You can return to CONFIGURATION mode by using the `exit` command.

PREFIX-LIST Mode

To configure a prefix list, use PREFIX-LIST mode.

To enter PREFIX-LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip prefix-list` command. Include a name for the prefix list. The prompt changes to include (conf-nprefixl).

You can return to CONFIGURATION mode by using the `exit` command.

PROTOCOL GVRP Mode

To enable and configure GARP VLAN Registration Protocol (GVRP), use PROTOCOL GVRP mode. For more information, refer to GARP VLAN Registration (GVRP).

To enter PROTOCOL GVRP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol gvrp` command. The prompt changes to include (config-gvrp).

You can return to CONFIGURATION mode by using the `exit` command.

RAPID SPANNING TREE (RSTP) Mode

To enable and configure RSTP, use RSTP mode. For more information, refer to Rapid Spanning Tree Protocol (RSTP).

To enter RSTP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol spanning-tree rstp` command. The prompt changes to include (conf-rstp).

You can return to CONFIGURATION mode by using the `exit` command.

ROUTE-MAP Mode

To configure a route map, use ROUTE-MAP mode.

To enter ROUTE-MAP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `route-map` *`map-name`* `[permit | deny] [`*`sequence-number`*`]` command. The prompt changes to include (config-route-map).

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER BGP Mode

To enable and configure Border Gateway Protocol (BGP), use ROUTER BGP mode. For more information, refer to Border Gateway Protocol IPv4 (BGPv4)

To enter ROUTER BGP mode:

1. Verify that you are logged in to CONFIGURATION mode.

2. Use the `router bgp` command then enter the AS number. The prompt changes to include (conf-router_bgp).

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER ISIS Mode

To enable and configure Intermediate System to Intermediate System (ISIS), use ROUTER ISIS mode. For more information, refer to Intermediate System to Intermediate System (IS-IS).

To enter ROUTER ISIS mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Use the `router isis` command. The prompt changes to include (conf-router_isis).

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER OSPF Mode

To configure OSPF, use ROUTER OSPF mode. For more information, refer to OSPFv2 Commands.

To enter ROUTER OSPF mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `router ospf {process-id}` command. The prompt changes to include (conf-router_*ospf-id*).

You can switch to INTERFACE mode by using the `interface` command or you can switch to ROUTER RIP mode by using the `router rip` command.

ROUTER OSPFV3 Mode

To configure OSPF for IPv6, use ROUTER OSPFV3 mode.

To enter ROUTER OSPFV3 mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ipv6 router ospf {process-id}` command. The prompt changes to include (conf-ipv6-router_ospf).

You can return to CONFIGURATION mode by using the `exit` command.

ROUTER RIP Mode

To enable and configure Router Information Protocol (RIP), use ROUTER RIP mode. For more information, refer to Routing Information Protocol (RIP).

To enter ROUTER RIP mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `router rip` command. The prompt changes to include (conf-router_rip).

You can return to CONFIGURATION mode by using the `exit` command.

SPANNING TREE Mode

To enable and configure the Spanning Tree protocol, use SPANNING TREE mode. For more information, refer to Spanning Tree Protocol (STP).

To enter SPANNING TREE mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `protocol spanning-tree` *stp-id* command. The prompt changes to include (conf-stp).

You can return to CONFIGURATION mode by using the `exit` command.

TRACE-LIST Mode

To configure a Trace list, use TRACE-LIST mode.

To enter TRACE-LIST mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `ip trace-list` command. Include the name of the Trace list. The prompt changes to include (conf-trace-acl).

You can exit this mode by using the `exit` command.

VLT DOMAIN Mode

To enable and configure the VLT domain protocol, use VLT DOMAIN mode. For more information, refer to Virtual Link Trunking (VLT).

To enter VLT DOMAIN mode:

1. Verify that you are logged in to CONFIGURATION mode.
2. Enter the `vlt domain`command then the VLT domain number. The prompt changes to include (conf-vlt-domain).

You can return to CONFIGURATION mode by entering the `exit` command.

VRRP Mode

To enable and configure Virtual Router Redundancy Protocol (VRRP), use VRRP mode. For more information, refer to Virtual Router Redundancy Protocol (VRRP).

To enter VRRP mode:

1. To enable VRRP globally, verify that you are logged in to CONFIGURATION mode.
2. Enter the `vrrp-group` command then enter the VRRP group ID. The prompt changes to include (conf-if-*interface-type-slot/port*-vrid-*vrrp-group-id*).

3

File Management

This chapter contains command line interface (CLI) commands needed to manage the configuration files as well as other file management commands.

cd

Change to a different working directory.

S6000

Syntax `cd` *`directory`*

Parameters

directory	(OPTIONAL) Enter one of the following: • `flash:` (internal Flash) or any sub-directory • `usbflash:` (internal Flash) or any sub-directory

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

HTTP Copy via CLI

Copy one file to another location. Dell Networking OS supports IPv4 and IPv6 addressing for FTP, TFTP, and SCP (in the *hostip* field).

This feature is supported on S6000 platform.

Syntax

```
copy http://10.16.206.77/sample_file flash://sample_filecopy
flash://sample_file http://10.16.206.77/sample_file
```

You can copy from the server to the switch and vice-versa.

Parameters

`copy http: flash:`	Address or name of remote host []: 10.16.206.77 Port number of the server [80]: Source file name []: sample_file User name to login remote host: x Password to login remote host: Destination file name [sample_file]:

Defaults None.

Command Modes EXEC

Command History

Version 9.3(0.1)	Introduced on the S6000, Z9000, S4810, and S4820T.

Example

```
copy http://admin:admin123@10.16.206.77/sample_file flash://
sample_file
```

Related Commands

`copy ftp:flash`

Copy files from FTP server to switch

copy

Copy one file to another location. Dell Networking OS supports IPv4 and IPv6 addressing for FTP, TFTP, and SCP (in the *hostip* field).

S6000

Syntax `copy compressed-config` *`source-file-url destination-file-url`*

Parameters Enter the following location keywords and information:

compressed-config	Enter the keyword `compressed-config` to copy one file, after optimizing and reducing the size of the configuration file, to another location. Dell Networking OS supports IPv4 and IPv6 addressing for FTP, TFTP, and SCP (in the hostip field).
file-url	

To copy a file from the internal FLASH	enter `flash://` followed by the filename
To copy a file on an FTP server	enter `ftp://` *`user:password@hostip/filepath`*
To copy the running configuration	enter the keyword `running-config`
To copy the startup configuration	enter the keyword `startup-config`
To copy using a Secure Copy (SCP),	enter the keyword `scp:` • If you enter `scp:` in the source position, enter the target URL; • If you enter `scp:` in the target position, first enter the source URL;
To copy a file on the external FLASH	enter `slot0://` followed by the filename
To copy a file on a TFTP server	enter `tftp://`*`hostip/filepath`*
To copy a file from an external USB drive	enter `usbflash://`*`filepath`*

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added the compressed-config parameter.
Version 9.0.2.0	Introduced on the S6000.

Version 8.4.1.0	Added IPv6 addressing support for FTP, TFTP, and SCP.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added `usbflash` and `rpm0usbflash` commands on E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series and added the SSH port number to the SCP prompt sequence on all systems.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

Dell Networking OS supports a maximum of 100 files at the root directory level, on both the internal and external Flash.

When copying a file to a remote location (for example, using Secure Copy [SCP]), enter only the keywords and Dell Networking OS prompts you need for the rest of the information. For example, when using SCP, you can enter `copy running-config scp:` where `running-config` is the source and the target is specified in the ensuing prompts. Dell Networking OS prompts you to enter any required information, as needed for the named destination—remote destination, destination filename, user ID, password, etc.

When you use the `copy running-config startup-config` command to copy the running configuration (the startup configuration file amended by any configuration changes made since the system was started) to the startup configuration file, Dell Networking OS creates a backup file on the internal flash of the startup configuration.

Dell Networking OS supports copying the running-configuration to a TFTP server or to an FTP server. For example:

- `copy running-config tftp:`
- `copy running-config ftp:`

You can compress the running configuration by grouping all the VLANs and the physical interfaces with the same property. Support to store the operating configuration to the startup config in the compressed mode and to perform an image downgrade without any configuration loss are provided.

Two existing exec mode CLIs are enhanced to display and store the running configuration in the compressed mode.

Example

```
Dell#copy running-config scp:/
Address or name of remote host []: 10.10.10.1
Destination file name [startup-config]? old_running
User name to login remote host? sburgess
Password to login remote host? dilling
```

In this `copy scp: flash:` example, specifying `SCP` in the first position indicates that the target is to be specified in the ensuing prompts. Entering `flash:` in the second position indicates that the target is the internal Flash. The source is on a secure server running SSH, so you are prompted for the user datagram protocol (UDP) port of the SSH server on the remote host.

Example

```
Dell#copy scp: flash:
Address or name of remote host []: 10.11.199.134
Port number of the server [22]: 99
Source file name []: test.cfg
User name to login remote host: admin
Password to login remote host:
Destination file name [test.cfg]: test1.cfg
```

Example

```
FTOS#copy compressed-config compressed-cfg
!
6655 bytes successfully copied
FTOS#
FTOS#copy compressed-config ftp:
Address or name of remote host []: 10.11.8.12
Destination file name [startup-config]:
User name to login remote host: spbalaji
Password to login remote host:
!
6655 bytes successfully copied
```

Related Commands

cd – changes the working directory.

delete

Delete a file from the flash. After deletion, files cannot be restored.

S6000

Syntax

`delete` *`flash-url`* `[no-confirm]`

Parameters

flash-url	Enter the following location and keywords: • For a file or directory on the internal Flash, enter `flash://` followed by the filename or directory name. • For a file or directory on an external USB drive, enter `usbflash://` followed by the filename or directory name.
no-confirm	(OPTIONAL) Enter the keyword `no-confirm` to specify that Dell Networking OS does not require user input for each file prior to deletion.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

dir

Display the files in a file system. The default is the current directory.

S6000

Syntax

```
dir [filename | directory name:]
```

Parameters

filename | *directory name*:	(OPTIONAL) Enter one of the following: • For a file or directory on the internal Flash, enter `flash://` then the filename or directory name. • For a file or directory on the external Flash, enter `usbflash://` then the filename or directory name.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
Dell#dir
Directory of flash:
1 -rwx 6478482 May 13 101 16:54:34 E1200.BIN
flash: 64077824 bytes total (57454592 bytes free)
Dell#
```

Related Commands

cd – changes the working directory.

format flash (S-Series)

Erase all existing files and reformat the filesystem in the internal flash memory. After the filesystem is formatted, files cannot be restored.

S6000

Syntax

```
format flash:
```

Defaults

flash memory

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series

Usage Information

You must include the colon (:) when entering this command.

After reformatting is complete, three empty directories are automatically created on flash: CRASH_LOG_DIR, TRACE_LOG_DIR and NVTRACE_LOG_DIR.

⚠ **CAUTION: This command deletes all files, including the startup configuration file. So, after executing this command, consider saving the running config as the startup config (use the `write memory` command or `copy run start` command).**

Related Commands	copy – copies the current configuration to either the startup-configuration file or the terminal. show file-systems – displays information about the file systems on the system.

fsck flash

Checks the flash file system for errors.

S6000

Syntax

```
fsck flash:

fsck usbflash:
```

Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.1(0.0)	Introduced on S4810 and Z9000.
Version 8.3.19.0	Introduced on S4820T.

Usage Information

Include the colon (:) when entering this command. This command checks the specified flash memory for errors. If errors are found, the command recommends that you format the flash.

⚠ **CAUTION: If you elect to format the flash, all files – including the startup configuration file – are lost. If you do decide to format the specified flash, consider saving the running configuration as the startup configuration after formatting the flash (use the `write memory` command or `copy run start` command).**

Related Commands

- copy — copy one file to another location.
- show file-systems — Display information about the file systems on the system.

rename

Rename a file in the local file system.

S6000

Syntax

`rename url url`

Parameters

url	Enter the following keywords and a filename: • For a file on the internal Flash, enter `flash://` followed by the filename. • For a file on an external USB drive, enter `usbflash://` followed by the filename.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on S-Series
Version 7.5.1.0	Introduced on C-Series
E-Series	Original command

show boot system

Displays information about boot images currently configured on the system.

S6000

Syntax `show boot system {stack-unit {0-11 | 0-7 | 0-5 | all}}`

Parameters

all	Enter the keyword `all` to display the boot image information for all line cards and rpms.
stack-unit	Enter the keyword `stack-unit` followed by a number to display boot image information for a stack-unit. The S6000 range is from 0 to 5.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the C-Series and E-Series.

Example

```
Dell#show boot system stack-unit 0

Current system image information in the system:
============================================

Type          Boot Type         A                        B
--------------------------------------------------------------
-
Stack-unit 0  FLASH BOOT     9-0(2-1)                9-0(2-0)
[boot]
Dell#
```

show bootvar

Display the variable settings for the boot parameters.

S6000

Syntax `show bootvar`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.4	Output expanded to display current reload mode (normal or Jumpstart).
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
Dell#show bootvar
PRIMARY IMAGE FILE =  system://B
SECONDARY IMAGE FILE =  tftp://10.16.127.35/Dell-SI-9-0-2-0.bin
DEFAULT IMAGE FILE =  system://A
LOCAL CONFIG FILE =  variable does not exist
PRIMARY HOST CONFIG FILE =  variable does not exist
SECONDARY HOST CONFIG FILE =  variable does not exist
PRIMARY NETWORK CONFIG FILE =  variable does not exist
SECONDARY NETWORK CONFIG FILE =  variable does not exist
CURRENT IMAGE FILE =  system://B
CURRENT CONFIG FILE 1 =  flash://startup-config
CURRENT CONFIG FILE 2 =  variable does not exist
CONFIG LOAD PREFERENCE =  local first
BOOT INTERFACE GATEWAY IP ADDRESS =  10.16.132.254
Reload Mode =  normal-reload
Dell#
```

show file-systems

Display information about the file systems on the system.

S6000

Syntax	`show file-systems`
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series
Version 7.5.1.0	Introduced on the C-Series
E-Series	Original command

Example

```
Dell#show file-systems
Size(b) Free(b) Feature Type Flags Prefixes
63938560 51646464 dosFs2.0 MMC rw flash:
63938560 18092032 dosFs1.0 MMC rw slot0:
- - - network rw ftp:
- - - network rw tftp:
- - - network rw scp:
Dell#
```

Command Fields

Field	Description
size(b)	Lists the size (in bytes) of the storage location. If the location is remote, no size is listed.
Free(b)	Lists the available size (in bytes) of the storage location. If the location is remote, no size is listed.
Feature	Displays the formatted DOS version of the device.
Type	Displays the type of storage. If the location is remote, the word `network` is listed.
Flags	Displays the access available to the storage location. The following letters indicate the level of access: • r = read access

Field	Description
	- w = write access
Prefixes	Displays the name of the storage location.

Related Commands

format flash (S-Series) – Erases all the existing files and reformats the filesystem in the internal flash memory on the S-Series.

show os-version

Display the release and software image version information of the image file specified.

S6000

Syntax

`show os-version [file-url]`

Parameters

file-url	(OPTIONAL) Enter the following location keywords and information: - For a file on the internal flash, enter `flash://` followed by the filename. - For a file on an FTP server, enter `ftp://user:password@hostip/filepath.` - For a file on a TFTP server, enter `tftp://hostip/filepath`. - For a file on the USB port, enter `usbflash://filepath`.

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
Dell#show os-version

RELEASE IMAGE INFORMATION :
---------------------------------------------------------------
------
      Platform Version Size ReleaseTime
 S-Series: SI 9-4(0-50) 49100764 Mar 6 2014 23:47:48

TARGET IMAGE INFORMATION :
---------------------------------------------------------------
------
          Type Version Target checksum
       runtime 9-4(0-50) Control Processor passed

BOOT IMAGE INFORMATION :
---------------------------------------------------------------
------
          Type Version Target checksum
    boot flash 3.1.1.3 Control Processor passed

BOOTSEL IMAGE INFORMATION :
---------------------------------------------------------------
------
          Type Version Target checksum
 boot selector 3.1.0.2 Control Processor passed

FPGA IMAGE INFORMATION :
---------------------------------------------------------------
------
         Card FPGA Name Version
 Stack-unit 0 S6000 SYSTEM CPLD 10
 Stack-unit 0 S6000 MASTER CPLD 12
 Stack-unit 0 S6000 SLAVE CPLD 10
Dell#
```

Usage Information

NOTE: A filepath that contains a dot (.) is not supported.

show running-config

Display the current configuration and display changes from the default values.

S6000

Syntax

`show running-config [entity] [configured] [status] [compressed]`

Parameters

entity	(OPTIONAL) To display that entity's current (non-default) configuration, enter one of the following keywords: NOTE: If you did not configure anything that entity, nothing displays and the prompt returns.

`aaa`	for the current AAA configuration
`acl`	for the current ACL configuration
`arp`	for the current static ARP configuration
`as-path`	for the current AS-path configuration
`bfd`	for the current BFD configuration
`bgp`	for the current BGP configuration
`boot`	for the current boot configuration
`cam-profile`	for the current CAM profile in the configuration
`class-map`	for the current class-map configuration
`community-list`	for the current community-list configuration
`ecmp-group`	for the current ECMP group configuration
`eis`	for the current EIS configuration
`ethernet`	for the current Ethernet CFM configuration
`fefd`	for the current FEFD configuration
`ftp`	for the current FTP configuration
`frrp`	for the current FRRP configuration
`fvrp`	for the current FVRP configuration
`gvrp`	for the current GVRP configuration
`host`	for the current host configuration
`hardware-monitor`	for hardware-monitor action-on-error settings
`hypervisor`	for the current hypervisor configuration
`igmp`	for the current IGMP configuration
`interface`	for the current interface configuration
`interface tunnel`	for all configured tunnels. For a specific tunnel, enter the tunnel ID. The range is from 1 to 16383.
`ip`	for the current IP configuration
`isis`	for the current ISIS configuration
`line`	for the current line configuration

lldp	for the current LLDP configuration
load-balance	for the current port-channel load-balance configuration
logging	for the current logging configuration
mac	for the current MAC ACL configuration
mac-address-table	for the current MAC configuration
management-eis	for the current management EIS configuration
management-route	for the current Management port forwarding configuration
mld	for the current MLD configuration
monitor	for the current Monitor configuration
mroute	for the current Mroutes configuration
msdp	for the current MSDP configuration
ntp	for the current NTP configuration
ospf	for the current OSPF configuration
pim	for the current PIM configuration
policy-map-input	for the current input policy map configuration
policy-map-output	for the current output policy map configuration
po-failover-group	for the current port-channel failover-group configuration
prefix-list	for the current prefix-list configuration
privilege	for the current privilege configuration
qos-policy-input	for the current input QoS policy configuration
qos-policy-output	for the current output QoS policy configuration
radius	for the current RADIUS configuration
redirect-list	for the current redirect-list configuration
redundancy	for the current RPM redundancy configuration
resolve	for the current DNS configuration
rip	for the current RIP configuration

rmon	for the current RMON configuration
route-map	for the current route map configuration
sflow	for the current sFlow configuration
snmp	for the current SNMP configuration
spanning-tree	for the current spanning tree configuration
static	for the current static route configuration
status	for the file status information
tacacs+	for the current TACACS+ configuration
tftp	for the current TFTP configuration
trace-group	for the current trace-group configuration
trace-list	for the current trace-list configuration
uplink-state-group	for the uplink state group configuration
users	for the current users configuration
vlt	for the current VLT configuration
wred-profile	for the current wred-profile configuration

configured	(OPTIONAL) Enter the keyword `configuration` to display line card interfaces with non-default configurations only.
status	(OPTIONAL) Enter the keyword `status` to display the checksum for the running configuration and the start-up configuration.
compressed	(Optional) Enter the keyword `compressed` to display the compressed group configuration. Displays the compressed configuration by grouping all similar configurations. The compression is done only for interface related configurations.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2.(0.0)	Added support for the tunnel and EIS interface types.
Version 9.0.0.0	Added support for the VLT option.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added the hardware-monitor option.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Expanded to include the last configuration change, start-up last updated (date and time), and who made the change.
Version 6.5.4.0	Added the status option.

Example

```
Dell# show running-config
Current Configuration ...
! Version 9-0(2-0)
! Last configuration change at Thu Apr 18 10:18:39 2013 by
admin
! Startup-config last updated at Thu Apr 18 10:18:40 2013 by
admin
!
boot system stack-unit 0 primary system: A:
boot system stack-unit 0 secondary tftp://10.16.127.35/Dell-
SI-9-0-2-0.bin
boot system stack-unit 0 default system: A:
boot system gateway 10.16.132.254
!
redundancy auto-synchronize full
redundancy disable-auto-reboot stack-unit
!
redundancy disable-auto-reboot stack-unit 0
redundancy disable-auto-reboot stack-unit 1
redundancy disable-auto-reboot stack-unit 2
redundancy disable-auto-reboot stack-unit 3
redundancy disable-auto-reboot stack-unit 4
redundancy disable-auto-reboot stack-unit 5
!
hardware watchdog stack-unit 0
hardware watchdog stack-unit 1
hardware watchdog stack-unit 2
```

Example

```
Dell#show running-config status
running-config bytes 10257, checksum 0xFD33339F
startup-config bytes 10257, checksum 0xFD33339F
```

Usage Information

The `status` option allows you to display the size and checksum of the running configuration and the startup configuration.

show startup-config

Display the startup configuration.

S6000

Syntax `show startup-config`

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on S-Series
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Expanded to include the last configuration change, start-up last updated (date and time), and who made the change.

Example

```
Dell#show startup-config
! Version 9-0(2-0)
! Last configuration change at Thu Apr 18 10:18:39 2013 by
admin
! Startup-config last updated at Thu Apr 18 10:18:40 2013 by
admin
!
boot system stack-unit 0 primary system: A:
boot system stack-unit 0 secondary tftp://10.16.127.35/Dell-
SI-9-0-2-0.bin
boot system stack-unit 0 default system: A:
boot system gateway 10.16.132.254
!
redundancy auto-synchronize full
redundancy disable-auto-reboot stack-unit
...
```

Related Commands show running-config – displays the current (running) configuration.

show version

Display the current Dell Networking Operating System (OS) version information on the system.

S6000

Syntax	`show version`
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Command Fields

Lines Beginning With	Description
Dell Network...	Name of the operating system
Dell Operating...	OS version number
Dell Application...	Software version
Copyright (c)...	Copyright information
Build Time...	Software build's date stamp
Build Path...	Location of the software build files loaded on the system
Dell Networking OS uptime is...	Amount of time the system has been up
System image...	Image file name
System Type:	S4810, S4820T, Z9000, S6000
Control Processor:...	Control processor information and amount of memory on processor
128K bytes...	Amount and type of memory on system

Lines Beginning With	Description
1 Route Processor...	Hardware configuration of the system, including the number and type of physical interfaces available

Example (S-Series)

```
Dell#show version
Dell Real Time Operating System Software
Dell Operating System Version: 1.0
Dell Application Software Version: E7-8-1-13
Copyright (c) 1999-2008 by Dell Force10 Networks, Inc.
Build Time: Mon Nov 24 18:59:27 2008
Build Path: /sites/sjc/work/sw/build/build2/Release/E7-8-1/SW/
SRC
Dell uptime is 1 minute(s)
System Type: S50V
Control Processor: MPC8451E with 252739584 bytes of memory.

32M bytes of boot flash memory.

  1 48-port E/FE/GE with POE (SB)
 48 GigabitEthernet/IEEE 802.3 interface(s)
  4 Ten GigabitEthernet/IEEE 802.3 interface(s)
Dell#
```

Example (S4810)

```
Dell#
Dell#show version
Dell Real Time Operating System Software
Dell Operating System Version: 1.0
Dell Application Software Version: Z9K-ICC-PRIM-SYNC-8-3-11-173
Copyright (c) 1999-2012 by Dell Inc. All Rights Reserved.
Build Time: Mon Jul 16 22:19:01 PDT 2012
Build Path: /local/local/build/build15/8.3.12.0/SW/SRC/Radius
Dell uptime is 1 minute(s)
System image file is "s4810-14"
System Type: S4810
Control Processor: Freescale QorIQ P2020 with 2147483648 bytes
of memory.
128M bytes of boot flash memory.
1 52-port GE/TE/FG (SE)
52 Ten GigabitEthernet/IEEE 802.3 interface(s)
Dell#
Dell#
Dell#
Dell#config t
Dell(conf)#int te 0/5
Dell(conf-if-te-0/5)#no shut
Dell(conf-if-te-0/5)#
Dell(conf-if-te-0/5)#
Dell(conf-if-te-0/5)#
Dell(conf-if-te-0/5)#ipv6 nd prefix FEC0::/10
Dell(conf-if-te-0/5)#
Dell(conf-if-te-0/5)#show conf
!
interface TenGigabitEthernet 0/5
ip address 78.21.1.3/24
ipv6 nd prefix fec0::/10
flowcontrol rx on tx on
no shutdown
```

```
Dell(conf-if-te-0/5)#
Dell#
```

Example (S6000)

```
Dell#S6000#show version
Dell  Real Time Operating System Software
Dell Operating System Version: 2.0
Dell Application Software Version: 9-4(0-119)
Copyright (c) 1999-2014 by Dell Inc. All Rights Reserved.
Build Time: Tue Mar 18 10:32:02 PDT 2014
Build Path: /work.local/build/buildSpaces/build01/E9-4-0/SW/
SRCC
Dell Networking OS uptime is 1 day(s), 0 hour(s), 19 minute(s)
System image file is "DT-MAA-S6000-16-PI"
System Type: S6000
Control Processor: Intel Centerton with 3203911680 bytes of
memory, core(s) 2.
16G bytes of boot flash memory.
1 32-port TE/FG (SI)
32 Forty GigabitEthernet/IEEE 802.3 interface(s)
```

upgrade system

Upgrade the system image.

S6000

Syntax

```
upgrade system {flash: | ftp: | scp: | tftp: | usbflash: |
stack-unit {0-5 | all} {A: | B:}
```

Parameters

0–5	Enter the keywords `0-5` to upgrade only the mentioned stack-unit.
all	Enter the keyword `all` to upgrade all the member units of the stack.
ftp	Enter the keyword `ftp` to follow it with the location of the source file in this form: *//userid:password@hostip/filepath*, or press **Enter** to launch a prompt sequence.
scp	Enter the keyword `scp` to follow it with the location of the source file in this form: *//userid:password@hostip/filepath*, or press **Enter** to launch a prompt sequence.
tftp	Enter the keyword `tftp` to follow it with the location of the source file in this form: *//hostlocation/filepath*, or press **Enter** to launch a prompt sequence.
flash	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.
usbflash	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.

A	Enter the keyword`A` to upgrade the bootflash partition A
B	Enter the keyword `B` to upgrade the bootflash partition B.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0(0.0)	Added support for IPv6 for the `file-url` parameter.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000. Added support for the SSD on the Z9000 only.
Version 8.3.7.0	Introduced on the S4810.

Usage Information You must reload FTOS after executing this command. Use the command upgrade system stack-unit to copy FTOS from the management unit to one or more stack members.

Example

```
Dell#upgrade system ?
flash: Copy from flash file system (flash://filepath)
ftp: Copy from remote file system, IPv4 or IPv6, (ftp://
userid:password@hostip/filepath)
scp: Copy from remote file system, IPv4 or IPv6, (scp://
userid:password@hostip/filepath)
stack-unit Sync image to the stack-unit
tftp: Copy from remote file system, IPv4 or IPv6, (tftp://
hostip/filepath)
usbflash: Copy from usbflash file system (usbflash://filepath)
Dell#
```

upgrade boot

Upgrade the bootflash image or bootselector image.

S6000

Syntax

```
upgrade boot {all | bootflash—image | bootselector-image}stack-
unit {0-5 | all}{booted | flash: | ftp: | scp: | tftp: |
usbflash:} {A: |B:}
```

Parameters

all	Enter the keyword `all` to change both the bootflash and bootselector images.
bootflash-image	Enter the keyword `bootflash-image` to change the bootflash image..
bootselector-image	Enter the keyword `bootselector-image` to upgrade the BIOS system image.
0–5	Enter the keywords `0–5` to upgrade only the mentioned stack-unit .
all	Enter the keywords `all` to upgrade the member stack-units.
booted	Enter the keyword `booted` to upgrade from the current image in the S6000.
ftp	Enter the keyword `ftp` to follow it with the location of the source file in this form: *//userid:password@hostip/filepath*, or press **Enter** to launch a prompt sequence.
tftp	Enter the keyword `tftp` to follow it with the location of the source file in this form: *//hostlocation/filepath*, or press **Enter** to launch a prompt sequence.
flash	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.
usbflash	Enter the keyword `flash` to follow it with the location of the source file in this form: *//filepath*, or press **Enter** to launch a prompt sequence.
A	Enter the keyword`A` to upgrade the bootflash partition A
B	Enter the keyword `B` to upgrade the bootflash partition B.

Defaults none

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0(0.0)	Added support for IPv6 for the `file-url` parameter.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000. Added support for the SSD on the Z9000 only.

Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Added support for TFTP and SCP.
Version 7.6.1.0	Introduced on the S-Series.

Usage Information

You must reload Dell Networking OS after executing this command.

Example

```
Dell#upgrade boot ?
all Upgrade both boot flash image and selector image
bootflash-image Upgrade boot flash image
bootselector-image Upgrade boot selector image
Dell#
```

verify

Validate the software image on the flash drive after the image has been transferred to the system, but before the image has been installed.

Syntax

`verify` { `md5` | `sha256` }[`flash://`] *`img-file`* [*`hash-value`*]

Parameters

md5	Enter the `md5` keyword to use the MD5 message-digest algorithm.
sha256	Enter the `sha256` keyword to use the SHA256 Secure Hash Algorithm
flash://	(Optional). Enter the `flash://` keyword. The default is to use the flash drive. You can just enter the image file name.
img-file	Enter the name the Dell Networking software image file to validate.
hash-value	(Optional). Enter the relevant hash published on i-Support.

Defaults

flash drive

Command Modes

EXEC mode

Command History

Version 9.5.(0.0)

Introduced on the Z9000, S6000, S4820T, S4810, MXL

Usage Information

You can enter this command in the following ways:

- **verify md5 flash**://*img-file*
- **verify md5 flash**://*img-file <hash-value>*

- **verify sha256 flash**://*img-file*
- **verify sha256 flash**://*img-file <hash-value>*

Example

Without Entering the Hash Value for Verification using SHA256

```
Dell# verify sha256 flash://FTOS-SE-9.5.0.0.bin
SHA256 hash for FTOS-SE-9.5.0.0.bin:
e6328c06faf814e6899ceead219afbf9360e986d692988023b749e6b2093e93
3
```

Entering the Hash Value for Verification using SHA256

```
Dell# verify sha256 flash://FTOS-SE-9.5.0.0.bin
e6328c06faf814e6899ceead219afbf9360e986d692988023b749e6b2093e93
3
SHA256 hash VERIFIED for FTOS-SE-9.5.0.0.bin
```

4

Control and Monitoring

This chapter contains the commands to configure and monitor the system, including Telnet, file transfer protocol (FTP), and trivial file transfer protocol (TFTP) as they apply to the following Dell Networking S6000 platform.

NOTE: Starting in version 9.0.2.0, the `enable xfp-power-updates` command was deprecated for the S6000 This command replaces the `enable optic-info-update interval` command to update information on temperature and power monitoring in the simple network management protocol (SNMP) management information base (MIB).

cam-acl

Allocate content addressable memory (CAM) for IPv4 and IPv6 ACLs.

S6000

Syntax

```
cam-acl {default | l2acl number ipv4acl number ipv6acl number ipv4qos number l2qos number l2pt number ipmacacl number [vman-qos | vman-dual-qos] number ecfmacl number
```

Parameters

default	Use the default CAM profile settings and set the CAM as follows: • L3 ACL (ipv4acl): 4 • L2 ACL(l2acl): 6 • IPv6 L3 ACL (ipv6acl): 0 • L3 QoS (ipv4qos): 2 • L2 QoS (l2qos): 1 • OpenFlow: 0 (disabled) • FCoE (fcoeacl): 0 (disabled) • iSCSI Optimization (iscsioptacl): 0 (disabled)

cam-acl {default | l2acl *number* ipv4acl *number* ipv6acl *number*, ipv4qos *number* l2qos *number*l2pt*number* ipmacacl *number* ecfmacl *number* [vman-qos | vman-dual-qos *number*}	Allocate space to each CAM region. Enter the CAM profile name then the amount of CAM space to be allotted. The total space allocated must equal 13. The ipv6acl range must be a factor of 2. Enter `4` or `8` for the number of OpenFlow FP blocks. • `4`: Creates 242 entries for use by the OpenFlow controller (256 total entries minus the 14 entries reserved for internal functionality) • `8`: Creates 498 entries for use by the OpenFlow controller (512 total entries minus the 14 entries reserved for internal functionality) Enter the CAM profile name followed by the amount to be allotted. The total space allocated must equal 13. The ipv6acl range must be a factor of 2.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.2)	Added support for the `fcoe` parameter on the S4810 and S4820T.
Version 9.1.(0.0)	Added support for OpenFlow on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Added the keywords `fcoeacl` and `iscsioptacl` on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Added the keywords `ecfmacl`, `vman-qos`, and `vman-dual-qos`.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.8.1.0	Introduced on the C-Series.

Usage Information

For the new settings to take effect, save the new CAM settings to the startup-config (`write-mem` or `copy run start`) then reload the system.

The total amount of space allowed is 16 FP Blocks. System flow requires three blocks and these blocks cannot be reallocated. The `ipv4acl` profile range is from 1 to 4.

When configuring space for IPv6 ACLs, the total number of Blocks must equal 13.

Ranges for the CAM profiles are from 1 to 10, except for the `ipv6acl` profile which is from 0 to 10. The `ipv6acl` allocation must be a factor of 2 (2, 4, 6, 8, 10).

If you enabled BMP, to perform a reload on the chassis to upgrade any configuration changes that have changed the NVRAM content, use the `reload conditional nvram-cfg-change` command.

clear line

Reset a terminal line.

S6000

Syntax

```
clear line {line-number | aux 0 | console 0 | vty number}
```

Parameters

line-number	Enter a number for one of the 12 terminal lines on the system. The range is from 0 to 11.
aux 0	Enter the keywords `aux 0` to reset the auxiliary port.
console 0	Enter the keywords `console 0` to reset the console port.
vty number	Enter the keyword `vty` then a number to clear a terminal line. The range is from 0 to 9.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

configure

Enter CONFIGURATION mode from EXEC Privilege mode.

S6000

Syntax

```
configure [terminal]
```

Parameters

terminal	(OPTIONAL) Enter the keyword `terminal` to specify that you are configuring from the terminal.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
Dell#configure
Dell(conf)#
```

disable

Return to EXEC mode.

S6000

Syntax	`disable [level]`
Parameters	*level* (OPTIONAL) Enter a number for a privilege level of the Dell Networking OS. The range is from 0 to 15. The default is **1**.
Defaults	**1**
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

do

Allows the execution of most EXEC-level commands from all CONFIGURATION levels without returning to the EXEC level.

S6000

Syntax	`do command`
Parameters	*command* Enter an EXEC-level command.
Defaults	none

Command Modes

- CONFIGURATION
- INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following commands are *not* supported by the `do` command:

- `enable`
- `disable`
- `exit`
- `config`

Example

```
Dell(conf-if-te-5/0)#do clear counters
Clear counters on all interfaces [confirm]
Dell(conf-if-te-5/0)#
Dell(conf-if-te-5/0)#do clear logging
Clear logging buffer [confirm]
Dell(conf-if-te-5/0)#
Dell(conf-if-te-5/0)#do reload
System configuration has been modified. Save? [yes/no]: n
Proceed with reload [confirm yes/no]: n
Dell(conf-if-te-5/0)#
```

enable

Enter EXEC Privilege mode or any other privilege level configured. After entering this command, you may need to enter a password.

S6000

Syntax	`enable [level]`
Parameters	*level* — (OPTIONAL) Enter a number for a privilege level of Dell Networking OS. The range is from 0 to 15.
Defaults	**15**
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

Users entering EXEC Privilege mode or any other configured privilege level can access configuration commands. To protect against unauthorized access, use the `enable password` command to configure a password for the `enable` command at a specific privilege level. If no privilege level is specified, the default is privilege level **15**.

NOTE: If you are authorized for the EXEC Privilege mode by your role, you do not need to enter an enable password.

Related Commands	enable password — configures a password for the `enable` command and to access a privilege level.

enable optic-info-update interval

Enable polling intervals of optical information updates for simple network management protocol (SNMP).

S6000

Syntax

```
enable optical-info-update interval seconds
```

To disable optical power information updates, use the `no enable optical-info-update interval` command.

Parameters

interval *seconds*	Enter the keyword `interval` then the polling interval in seconds. The range is from 120 to 6000 seconds. The default is **300 seconds** (5 minutes).

Defaults: Disabled

Command Modes: CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Replacement command for the S4820T. Replaces the `enable xfp-power-updates` command.
Version 8.3.11.4	Replacement command for the Z9000. Replaces the `enable xfp-power-updates` command
Version 8.3.10.0	Replacement command for the S4810 only. Replaces the `enable xfp-power-updates` command.

Usage Information

To enable polling and to configure the polling frequency, use this command.

end

Return to EXEC Privilege mode from other command modes (for example, CONFIGURATION or ROUTER OSPF modes).

S6000

Syntax `end`

Command Modes

- CONFIGURATION
- SPANNING TREE
- MULTIPLE SPANNING TREE
- LINE
- INTERFACE
- TRACE-LIST
- VRRP
- ACCESS-LIST
- PREFIX-LIST
- AS-PATH ACL
- COMMUNITY-LIST
- ROUTER OSPF
- ROUTER RIP
- ROUTER ISIS
- ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series and E-Series.
E-Series	Original command.

Related Commands

exit — returns to the lower command mode.

exec-banner

Enable the display of a text string when the user enters EXEC mode.

S6000

Syntax	`exec-banner` To disable the banner on terminal lines, use the `no exec-banner` command.
Defaults	**Enabled on all lines** (if configured, the banner appears).
Command Modes	LINE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information	Optionally, use the `banner exec` command to create a text string that is displayed when you access EXEC mode. This command toggles that display.
Related Commands	line — enables and configures console and virtual terminal lines to the system.

exec-timeout

Set a time interval that the system waits for input on a line before disconnecting the session.

S6000

Syntax	`exec-timeout` *`minutes`* `[`*`seconds`*`]` To return to default settings, use the `no exec-timeout` command.

Parameters

minutes	Enter the number of minutes of inactivity on the system before disconnecting the current session. The range is from 0 to 35791. The default is **10 minutes** for the console line and **30 minutes** for the VTY line.
seconds	(OPTIONAL) Enter the number of seconds. The range is from 0 to 2147483. The default is **0 seconds**.

Defaults

10 minutes for console line; **30 minutes** for VTY lines; **0 seconds**

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

To remove the time interval, enter `exec-timeout 0 0`.

Example

```
Dell con0 is now available
Press RETURN to get started.
Dell>
```

exit

Return to the lower command mode.

S6000

Syntax

```
exit
```

Command Modes

- EXEC Privilege
- CONFIGURATION

- LINE, INTERFACE
- TRACE-LIST
- PROTOCOL GVRP
- SPANNING TREE
- MULTIPLE SPANNING TREE
- MAC ACCESS LIST
- ACCESS-LIST
- AS-PATH ACL
- COMMUNITY-LIST
- PREFIX-LIST
- ROUTER OSPF
- ROUTER RIP
- ROUTER ISIS
- ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Related Commands

end — returns to EXEC Privilege mode.

ftp-server enable

Enable FTP server functions on the system.

S6000

Syntax `ftp-server [vrf vrf-name] enable`

Parameters	**vrf** *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to enable the FTP server to listen to that VRF instance. **NOTE:** Use this attribute to specify the VRF that is used by the FTP server to accept client connections. If no VRF is specified, then the default VRF is used.

Defaults Disabled

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
morpheus% ftp 10.31.1.111
Connected to 10.31.1.111.
220 Dell (1.0) FTP server ready
Name (10.31.1.111:dch): dch
331 Password required
Password:
230 User logged in
ftp> pwd
257 Current directory is "flash:"
ftp> dir
200 Port set okay
150 Opening ASCII mode data connection
size  date       time name
-------- ------ ------ --------
 512  Jul-20-2004  18:15:00 tgtimg
 512  Jul-20-2004  18:15:00 diagnostic
 512  Jul-20-2004  18:15:00 other
 512  Jul-20-2004  18:15:00 tgt
226 Transfer complete
```

```
329 bytes received in 0.018 seconds (17.95 Kbytes/s)
ftp>
```

ftp-server topdir

Specify the top-level directory to be accessed when an incoming FTP connection request is made.

S6000

Syntax `ftp-server topdir directory`

Parameters

directory	Enter the directory path.

Defaults The internal flash is the default directory.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

After you enable FTP server functions with the `ftp-server enable` command, Dell Networking recommends specifying a top-level directory path. Without a top-level directory path specified, the Dell Networking OS directs users to the flash directory when logging in to the FTP server.

Related Commands

ftp-server enable — enables FTP server functions on the E-Series.

ftp-server username — sets a username and password for incoming FTP connections to the E-Series.

ftp-server username

Create a user name and associated password for incoming FTP server sessions.

S6000

Syntax

`ftp-server username` *`username`* `password [`*`encryption-type`*`]` *`password`*

To delete a user name and its password, use the `no ftp-server username username` command.

Parameters

username	Enter a text string up to 40 characters long as the user name.
password *password*	Enter the keyword `password` then a string up to 40 characters long as the password. Without specifying an encryption type, the password is unencrypted.
encryption-type	(OPTIONAL) After the keyword `password`, enter one of the following numbers: • `0` (zero) for an unecrypted (clear text) password • `7` (seven) for a hidden text password

Defaults Not enabled.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

hostname

Set the host name of the system.

S6000

Syntax `hostname name`

Parameters

name	Enter a text string, up to 32 characters long.

Defaults **Dell**

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information The hostname is used in the prompt.

ip ftp password

Specify a password for outgoing FTP connections.

S6000

Syntax

`ip ftp password [encryption-type] password`

To remove a password and return to the default setting, use the `no ip ftp password [password]` command.

Parameters

encryption-type	(OPTIONAL) Enter one of the following numbers: • `0` (zero) for an unecrypted (clear text) password • `7` (seven) for a hidden text password
password	Enter a string up to 40 characters as the password.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

The password is listed in the configuration file; you can view the password by entering the `show running-config ftp` command.

Use the `ip ftp password` command when you use the `ftp: parameter` in the `copy` command.

Related Commands

ip ftp username — sets the user name for the FTP sessions.

ip ftp source-interface

Specify an interface’s IP address as the source IP address for FTP connections.

S6000

Syntax

`ip ftp source-interface interface`

To delete an interface, use the `no ip ftp source-interface interface` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16383. • For a Port Channel interface, enter the keyword `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094. • For a tunnel interface, enter the keyword `tunnel`.

Defaults

The IP address on the system that is closest to the Telnet address is used in the outgoing packets.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.2.1.0	Increased number of VLANs on ExaScale to 4094 (was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

ip tftp vrf

Configures an TFTP client with a VRF that is used to connect to the TFTP server.

Syntax

`ip tftp [vrf vrf-name]`

To undo the TFTP client configuration, use the `no ip tftp [vrf vrf-name]` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to specify the VRF that is used by the TFTP client.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *FTOS Command Line Reference Guide*.

The following is a list of the FTOS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command to make the TFTP clients VRF aware. The VRF name that you specify is used by the TFTP client to reach the TFTP server. If no VRF is specified, then the default VRF is used.

Related Commands

ftp-server topdir — sets the directory to be used for incoming FTP connections to the E-Series.

ftp-server username — sets a username and password for incoming FTP connections to the E-Series.

ip ftp username

Assign a user name for outgoing FTP connection requests.

S6000

Syntax	`ip ftp username username` To return to anonymous FTP connections, use the `no ip ftp username [username]` command.
Parameters	*username* — Enter a text string as the user name up to 40 characters long.
Defaults	No user name is configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information	Configure a password with the `ip ftp password` command.
Related Commands	ip ftp password — sets the password for FTP connections.

ip ftp vrf

Configures an FTP client with a VRF that is used to connect to the FTP server.

Syntax	`ip ftp [vrf vrf-name]` To undo the FTP client configuration, use the `ip ftp [vrf vrf-name]` command.
Parameters	**vrf *vrf-name*** — Enter the keyword `vrf` and then the name of the VRF to specify the VRF that is used by the FTP client.
Defaults	Disabled
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *FTOS Command Line Reference Guide*. The following is a list of the FTOS version history for this command. Version 9.4.(0.0) — Introduced on the S-Series and Z-Series.
Usage Information	Use this command to make the FTP clients VRF aware. The VRF name that you specify is used by the FTP client to reach the FTP server. If no VRF is specified, then the default vrf is used.

ip telnet server enable

Enable the Telnet server on the switch.

S6000

Syntax	`ip telnet server enable` To disable the Telnet server, use the `no ip telnet server enable` command.
Defaults	Enabled
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Related Commands ip ssh server — enables the secure shell (SSH) server on the system.

ip telnet server vrf

Configures the TELNET server on either a specific VRF or a management VRF.

Syntax `ip telnet server vrf {management | vrf-name}`

To undo the TELNET server configuration, use the `no ip telnet server [vrf vrf-name]` command.

Parameters

vrf management	Enter the keyword `vrf` followed by the keyword `management` to specify a management VRF that is used by the TELNET server.
vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to specify the VRF that is used by the TELNET server.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *FTOS Command Line Reference Guide*.

The following is a list of the FTOS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information You can enable the TELNET server on either a management VRF or a user defined VRF but not both. If you do not specify a VRF, then the TELNET server is enabled on the default VRF.

Example

```
FTOS(conf)#ip telnet server vrf vrf1
FTOS(conf)#no ip telnet server vrf
FTOS(conf)#ip telnet server vrf management
FTOS(conf)#no ip telnet server vrf
```

ip telnet source-interface

Set an interface's IP address as the source address in outgoing packets for Telnet sessions.

S6000

Syntax

`ip telnet source-interface` *`interface`*

To return to the default setting, use the `no ip telnet source-interface [`*`interface`*`]` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16383. • For a Port Channel, enter the keyword `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094. • For a tunnel interface, enter the keyword `tunnel`.

Defaults

The IP address on the system that is closest to the Telnet address is used in the outgoing packets.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.2.1.0	Increased number of VLANs on ExaScale to 4094 (was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command

Related Commands

telnet — telnet to another device.

ip tftp vrf

Configures an TFTP client with a VRF that is used to connect to the TFTP server.

Syntax

`ip tftp [vrf *vrf-name*]`

To undo the TFTP client configuration, use the `no ip tftp [vrf vrf-name]` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to specify the VRF that is used by the TFTP client.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *FTOS Command Line Reference Guide*.

The following is a list of the FTOS version history for this command.

Version 9.4. (0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command to make the TFTP clients VRF aware. The VRF name that you specify is used by the TFTP client to reach the TFTP server. If no VRF is specified, then the default VRF is used.

Related Commands

ftp-server topdir — sets the directory to be used for incoming FTP connections to the E-Series.

ftp-server username — sets a username and password for incoming FTP connections to the E-Series.

line

Enable and configure console and virtual terminal lines to the system. This command accesses LINE mode, where you can set the access conditions for the designated line.

S6000

Syntax `line {aux 0 |console 0 | vty number [end-number]}`

Parameters

aux 0	Enter the keyword **aux 0** to configure the auxiliary terminal connection.
console 0	Enter the keyword `console 0` to configure the console port. The console option for the S-Series is `<0-0>`.
vty *number*	Enter the keyword `vty` then a number from 0 to 9 to configure a virtual terminal line for Telnet sessions. The system supports 10 Telnet sessions.
end-number	(OPTIONAL) Enter a number from 1 to 9 as the last virtual terminal line to configure. You can configure multiple lines at one time.

Defaults Not configured

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

E-Series	Original command

Usage Information	You cannot delete a terminal connection.
Related Commands	access-class — restricts the incoming connections to a particular IP address in an IP access control list (ACL). password — specifies a password for users on terminal lines.

motd-banner

Enable a message of the day (MOTD) banner to appear when you log in to the system.

S6000

Syntax

`motd-banner`

To disable the MOTD banner, use the `no motd-banner` command.

Defaults

Enabled on all lines.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command

ping

Test connectivity between the system and another device by sending echo requests and waiting for replies.

S6000

Syntax

```
ping [host | ip-address | ipv6-address] [count {number |
continuous}] [datagram-size] [timeout] [source (ip src-ipv4-
address) | interface] [tos] [df-bit (y|n)] [validate-reply(y|
n)] [outgoing-interface] [pattern pattern] [sweep-min-size]
[sweep-max-size] [sweep-interval] [ointerface (ip src-ipv4-
address) | interface]
```

Parameters

host	(OPTIONAL) Enter the host name of the devices to which you are testing connectivity.
ip-address	(OPTIONAL) Enter the IPv4 address of the device to which you are testing connectivity. The address must be in the dotted decimal format.
ipv6-address	(OPTIONAL) Enter the IPv6 address, in the x:x:x:x::x format, to which you are testing connectivity. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
count	Enter the number of echo packets to be sent. The default is **5**. - number: from 1 to 2147483647 - continuous: transmit echo request continuously
datagram size	Enter the ICMP datagram size. The range is from 36 to 15360 bytes. The default is **100**.
timeout	Enter the interval to wait for an echo reply before timing out. The range is from 0 to 3600 seconds. The default is **2 seconds**.
source	Enter the IPv4 or IPv6 source ip address or the source interface. For IPv6 addresses, you may enter global addresses only. Enter the IP address in A.B.C.D format. - For a Port Channel interface, enter the keyword `port-channel` then a number: The range is from 1 to 128. - For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. - For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. - For a Tunnel interface, enter the keyword `tunnel` then a number from 1 to 16383. - For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

tos	(IPv4 only) Enter the type of service required. The range is from 0 to 255. The default is **0**.
df-bit	(IPv4 only) Enter `Y` or `N` for the "don't fragment" bit in IPv4 header. • `N`: Do not set the "don't fragment" bit. • `Y`: Do set "don't fragment" bit Default is **No**.
validate-reply	(IPv4 only) Enter `Y` or `N` for reply validation. • `N`: Do not validate reply data. • `Y`: Do validate reply data. Default is `No`.
outgoing-interface	(IPv6 link-local address) Enter the outgoing interface for ping packets to a destination link-local address.
pattern *pattern*	(IPv4 only) Enter the IPv4 data pattern. Range: 0-FFFF. Default: **0xABCD**.
sweep-min-size	Enter the minimum size of datagram in sweep range. The range is from 52 to 15359 bytes.
sweep-max-size	Enter the maximum size of datagram in sweep range. The range is from 53 to 15359 bytes.
sweep-interval	Enter the incremental value for sweep size. The range is from 1 to 15308 seconds.
interface	(IPv4 only) Enter the outgoing interface for multicast packets. Enter the IP address in A.B.C.D format. • For a Port Channel, enter the keyword `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T. Added support for the `outgoing-interface` option for link-local IPv6 addressing on the S4820T.
Version 8.3.12.0	Added support for the `outgoing-interface` option for link-local IPv6 addressing on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on the ExaScale.
Version 8.4.1.0	IPv6 pinging available on management interface.
Version 8.3.1.0	Introduced extended ping options.
Version 8.2.1.0	Introduced on the E-Series ExaScale (IPv6).
Version 8.1.1.0	Introduced on the E-Series ExaScale (IPv4).
Version 7.9.1.0	Introduced VRF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for IPv6 address on the E-Series.

Usage Information

When you enter the `ping` command without specifying an IP/IPv6 address (Extended Ping), you are prompted for a target IP/IPv6 address, a repeat count, a datagram size (up to 1500 bytes), a timeout (in seconds), and for Extended Commands. For information on the ICMP message codes that return from a `ping` command, refer to ICMP Message Types.

The following table provides descriptions for the `ping` command status response symbols displayed in the output.

Symbol	Description
!	Each exclamation point indicates receipt of a reply.
.	Each period indicates the network server timed out while waiting for a reply.
U	A destination unreachable error PDU was received.
Q	Source quench (destination too busy).
M	Could not fragment.
?	Unknown packet type.
&	Packet lifetime exceeded.

Example (IPv4)

```
Dell#ping 172.31.1.255
```

```
Type Ctrl-C to abort.

Sending 5, 100-byte ICMP Echos to 172.31.1.255, timeout is 2
seconds:
Reply to request 1 from 172.31.1.208 0 ms
Reply to request 1 from 172.31.1.216 0 ms
Reply to request 1 from 172.31.1.205 16 ms
::
Reply to request 5 from 172.31.1.209 0 ms
Reply to request 5 from 172.31.1.66 0 ms
Reply to request 5 from 172.31.1.87 0 ms
Dell#
```

Example (IPv6)

```
Dell#ping 100::1

Type Ctrl-C to abort.

Sending 5, 100-byte ICMP Echos to 100::1, timeout is 2 seconds:
!!!!!
Success rate is 100.0 percent (5/5), round-trip min/avg/max =
0/0/0 (ms)
Dell#
```

reload

Reboot Dell Networking Operating System (OS).

S6000

Syntax `reload [conditional nvram-cfg-change]`

Parameters

conditional *nvram-cfg-change*	Reload if the condition is true. A configuration change to the nvram requires a switch reload. To reload the switch, select *nvram-cfg-change*.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 9.1(0.0)	Added 'conditional' parameter.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

If there is a change in the configuration, FTOS prompts you to save the new configuration. Or you can save your running configuration with the `copy running-config` command. Use the conditional parameter if any configuration changes made to the nvram, such as stack-group and fanout configurations, must be saved.

send

Send messages to one or all terminal line users.

S6000

Syntax

```
send [*] | [line ] | [console] | [vty]
```

Parameters

*****	Enter the asterisk character `*` to send a message to all tty lines.
line	Send a message to a specific line. The range is from 0 to 11.
console	Enter the keyword `console` to send a message to the primary terminal line.
vty	Enter the keyword `vty` to send a message to the virtual terminal.

Defaults

none

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced on the E-Series.

Usage Information

Messages can contain an unlimited number of lines; however, each line is limited to 255 characters. To move to the next line, use `<CR>`. To send the message use `CTR-Z`; to abort a message, use `CTR-C`.

service timestamps

To debug and log messages, add time stamps. This command adds either the uptime or the current time and date.

S6000

Syntax

```
service timestamps [debug | log] [datetime [localtime] [msec]
[show-timezone] | uptime]
```

To disable timestamping, use the `no service timestamps [debug | log]` command.

Parameters

debug	(OPTIONAL) Enter the keyword `debug` to add timestamps to debug messages.
log	(OPTIONAL) Enter the keyword `log` to add timestamps to log messages with severity from 0 to 6.
datetime	(OPTIONAL) Enter the keyword `datetime` to have the current time and date added to the message.
localtime	(OPTIONAL) Enter the keyword `localtime` to include the localtime in the timestamp.
msec	(OPTIONAL) Enter the keyword `msec` to include milliseconds in the timestamp.
show-timezone	(OPTIONAL) Enter the keyword `show-timezone` to include the time zone information in the timestamp.
uptime	(OPTIONAL) Enter the keyword `uptime` to have the timestamp based on time elapsed since system reboot.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

If you do not specify parameters and enter service timestamps, it appears as service timestamps debug uptime in the running-configuration.

To view the current options set for the `service timestamps` command, use the `show running-config` command.

show alarms

View alarms currently active in the system.

S6000

Syntax

```
show alarms [threshold]
```

Parameters

threshold	(OPTIONAL) Enter the keyword `threshold` to display the temperature thresholds in Celcuis for each level.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Example

```
Dell# show alarms
-- Minor Alarms --
Alarm Type Duration
----------------------------------------------
RPM 0 PEM A failed or rmvd 7 hr, 37 min
SFM 0 PEM A failed or rmvd 7 hr, 37 min
SFM 1 PEM A failed or rmvd 7 hr, 37 min
SFM 2 PEM A failed or rmvd 7 hr, 37 min
SFM 3 PEM A failed or rmvd 7 hr, 37 min
SFM 4 PEM A failed or rmvd 7 hr, 37 min
SFM 5 PEM A failed or rmvd 7 hr, 37 min
SFM 6 PEM A failed or rmvd 7 hr, 37 min
SFM 7 PEM A failed or rmvd 7 hr, 36 min
stack-unit 1 PEM A failed or rmvd 7 hr, 36 min
stack-unit 4 PEM A failed or rmvd 7 hr, 36 min
only 8 SFMs in chassis 7 hr, 35 min

-- Major Alarms --

Alarm Type Duration
----------------------------------------------
No major alarms
Dell#
```

show command-tree

Display the entire CLI command tree, and optionally, display the utilization count for each command and its options.

S6000

Syntax `show command-tree [count | no]`

Parameters

count	Display the command tree with a usage counter for each command.

no	Display all of the commands that may be preceded by the keyword `no`, which is the keyword used to remove a command from the running-configuration.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.2.1.0	Introduced.

Usage Information

Reload the system to reset the command-tree counters.

Example

```
Dell#show command-tree count
!
Enable privilege mode:

enable command usage:3
  <0-15> option usage: 0

exit   command usage:1

show   command-tree command usage:9
count option usage: 3

show version command usage:1
!
Global configuration mode:

aaa authentication enable command usage:1
  WORD    option usage: 1
  default option usage: 0
  enable  option usage: 0
  line    option usage: 0
  none    option usage: 0
  radius  option usage: 1
  tacacs+ option usage: 0
```

show cpu-traffic-stats

View the CPU traffic statistics.

S6000

Syntax

```
show cpu-traffic-stats [port number | all | cp ]
```

Parameters

port number	(OPTIONAL) Enter the port number to display traffic statistics on that port only. The range is from 1 to 1568.
all	(OPTIONAL) Enter the keyword `all` to display traffic statistics on all the interfaces receiving traffic, sorted based on the traffic.
cp	(OPTIONAL) Enter the keyword `cp` to display traffic statistics on the specified CPU.

Defaults **all**

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Traffic statistics are sorted on a per-interface basis; the interface receiving the most traffic is displayed first. All CPU and port information is displayed unless a specific port or CPU is specified. Traffic information is displayed for router ports only; not for management interfaces. The traffic statistics are collected only after the `debug cpu-traffic-stats` command is executed; not from the system bootup.

NOTE: After debugging is complete, use the `no debug cpu-traffic-stats` command to shut off traffic statistics collection.

Example

```
Dell#show cpu-traffic-stats
Processor : CP
--------------
Received 100% traffic on GigabitEthernet 8/2 Total packets:100
LLC:0, SNAP:0, IP:100, ARP:0, other:0
Unicast:100, Multicast:0, Broadcast:0
Processor : RP1
---------------
Received 62% traffic on GigabitEthernet 8/2 Total packets:500
LLC:0, SNAP:0, IP:500, ARP:0, other:0
Unicast:500, Multicast:0, Broadcast:0
Received 37% traffic on GigabitEthernet 8/1 Total packets:300
LLC:0, SNAP:0, IP:300, ARP:0, other:0
Unicast:300, Multicast:0, Broadcast:0
Processor : RP2
---------------
No CPU traffic statistics.
Dell#
```

show debugging

View a list of all enabled debugging processes.

S6000

Syntax `show debugging`

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series
E-Series	Original command.

Example

```
Dell#show debug
Generic IP:
  IP packet debugging is on for
    ManagementEthernet 0/0
    Port-channel 1-2
    Port-channel 5
    GigabitEthernet 4/0-3,5-6,10-11,20
    GigabitEthernet 5/0-1,5-6,10-11,15,17,19,21
  ICMP packet debugging is on for
    GigabitEthernet 5/0,2,4,6,8,10,12,14,16
Dell#
```

show environment

View S-Series and Z-Series system component status (for example, temperature or voltage).

S6000

Syntax

```
show environment [all | fan | stack-unit unit-id | pem]
```

Parameters

all	Enter the keyword `all` to view all components.
fan	Enter the keyword `fan` to view information on the fans. The output of this command is chassis dependent.
stack-unit *unit-id*	Enter the keyword `stack-unit` then the unit-id to display information on a specific stack member. The range is from 0 to 1.
pem	Enter the keyword `pem` to view only information on power entry modules.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 8.3.11.1	Introduced on the Z9000.
Version 7.8.1.0	The output of the `show environment fan` command for the S-Series is changed to display fan speeds instead of showing the fan status as up or down.

Usage Information

The following example shows the output of the `show environment fan` command.

Example (all)

```
Dell#show environment

--  Fan  Status  --
Unit Bay   TrayStatus  Fan0    Speed   Fan1    Speed
---------------------------------------------------------------
---------------------
0    0     up          up      6971    up      7072
0    1     up          up      6971    up      7021
0    2     up          up      7021    up      7021

Speed in RPM

--  Power Supplies  --
Unit   Bay   Status       Type    FanStatus   FanSpeed(rpm)
---------------------------------------------------------------
------------
  0     0    down         UNKNOWN down        0
  0     1    up           AC      up          6504

-- Unit Environment Status  --
Unit  Status        Temp   Voltage      TempStatus
---------------------------------------------------------------
------------
* 0   online        36C    ok            1

* Management Unit

--  Thermal Sensor Readings (deg C)  --
Unit  Sensor0  Sensor1  Sensor2  Sensor3  Sensor4  Sensor5
Sensor6
---------------------------------------------------------------
------
  0       40       36       37       37       31
31       46

Dell#show environment fan

--  Fan  Status  --
Unit Bay   TrayStatus  Fan0    Speed   Fan1    Speed
---------------------------------------------------------------
---------------------
0    0     up          up      7021    up      7021
0    1     up          up      6971    up      7072
0    2     up          up      7021    up      6971

Speed in RPM

Dell#show environment pem

--  Power Supplies  --
Unit   Bay   Status      Type      FanStatus   FanSpeed(rpm)
---------------------------------------------------------------
------------
```

```
  0     0    down       UNKNOWN       down        0
  0     1    up         AC             up          6504

Dell#show environment thermal-sensor

--  Thermal Sensor Readings (deg C)  --

Unit  Sensor0  Sensor1  Sensor2  Sensor3  Sensor4  Sensor5
Sensor6
---------------------------------------------------------------
--------------------
  0    39       36        37        37      31
31         46
```

show inventory

Display the S-Series or Z-Series switch type, components (including media), and Dell Networking Operating System (OS), including hardware identification numbers and configured protocols.

S6000

Syntax `show inventory [media` *`slot`*`]`

Parameters

media ***slot***	(OPTIONAL) Enter the keyword `media` then the stack ID of the stack member for which you want to display pluggable media inventory. **NOTE:** This parameter is available but not supported in Dell Networking Operating System version 8.3.11.4. Because stacking is not supported, if you use this parameter, the output displays “Media not present or accessible” (refer to the *Usage Information* section).

Defaults none

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.4	Output expanded to include Piece Part ID (PPID) and eSR4 optics.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced this version of the command for S-Series. S-Series output differs from E-Series.

Usage Information

If there are no fiber ports in the unit, just the header under *show inventory media* displays. If there are fiber ports but no optics inserted, the output displays *Media not present or accessible*.

Example (S6000)

```
Dell#show inventory
System Type            : S6000
System Mode            : 1.0
Software Version       : 9-4(0-168)

Unit Type               Serial Number  Part Number
Rev         Piece Part ID          Rev  Svc Tag  Exprs Svc Code
---------------------------------------------------------------
------------------------------------------------------
* 0  S6000-01-FE-32T    NA             08YWFG       A00
CN-08YWFG-28298-39Q-0015 A00  24N1VS1  463       414 838 5
  0  S6000-PWR-AC       NA             0T9FNW       A00
CN-0T9FNW-28298-39Q-0005 A00  NA       NA
  0  S6000-FAN          NA             0MGDH8       A00
CN-0MGDH8-28298-39Q-0009 A00  NA       NA
  0  S6000-FAN          NA             0MGDH8       A00
CN-0MGDH8-28298-39Q-0007 A00  NA       NA
  0  S6000-FAN          NA             0MGDH8       A00
CN-0MGDH8-28298-39Q-0008 A00  NA       NA

* - Management Unit


Software Protocol Configured
--------------------------------------------------------------
  LLDP
```

Example

```
Dell#show inventory media
Slot   Port     Type        Media               Serial
Number        F10Qualified
---------------------------------------------------------------
---------------
   0      0     QSFP        40GBASE-CR4-1M
APF11200012UQQ           Yes
   0      1     QSFP        40GBASE-CR4-1M
APF11200012UQQ           Yes
   0      2     QSFP        40GBASE-CR4-1M
APF11200012UQQ           Yes
   0      3     QSFP        40GBASE-CR4-1M
APF11200012UQQ           Yes
   0      4     QSFP        40GBASE-CR4-1M
APF11200012UR1           Yes
   0      5     QSFP        40GBASE-CR4-1M
APF11200012UR1           Yes
   0      6     QSFP        40GBASE-CR4-1M
APF11200012UR1           Yes
```

```
   0       7     QSFP        40GBASE-CR4-1M
APF11200012UR1             Yes
   0       8     QSFP        40GBASE-CR4-1M
APF12300017GEY             Yes
   0       9     QSFP        40GBASE-CR4-1M
APF12300017GEY             Yes
   0      10     QSFP        40GBASE-CR4-1M
APF12300017GEY             Yes
```

Related Commands

- show interfaces — displays the interface configuration.
- show interfaces transceiver — displays the physical status and operational status of an installed transceiver. The output also displays the transceiver's serial number.

show memory

View current memory usage on the switch.

S6000

Syntax

`show memory [stack-unit id]`

Parameters

stack-unit *id*	(OPTIONAL) Enter the keyword `stack-unit` then the stack unit ID of the S-Series stack member to display memory information on the designated stack member. The unit ID range from 0 to 11.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced this version of the command for the S-Series.

Usage Information

The output for `show memory` displays the memory usage of LP part (sysdlp) of the system. The sysdlp is an aggregate task that handles all the tasks running on the S-Series' CPU.

Example

```
Dell#show memory stack-unit 0
Statistics On Unit 0 Processor
===========================
Total(b)  Used(b) Free(b)   Lowest(b) Largest(b)
268435456 4010354 264425102 264375410 264425102
```

Example (S4820T)

```
Dell#show memory stack 0
Statistics On Unit 0 Processor
===========================
Total(b)   Used(b) Free(b)    Lowest(b)  Largest(b)
2147483648 4322398 2143161250 2142548382 2143161250
Dell#
```

show processes cpu

Display CPU usage information based on processes running.

S6000

Syntax

`show processes cpu [management-unit 1-99 [details] | stack-unit id | summary | [stack-unit id]]`

Parameters

management-unit *1-99* [details]	(OPTIONAL) Display processes running in the control processor. The `1-99` variable sets the number of tasks to display in order of the highest CPU usage in the past five (5) seconds. Add the keyword `details` to display all running processes (except sysdlp). Refer to Example (management-unit).
stack-unit *id*	(OPTIONAL) Enter the keyword `stack-unit` then the stack member ID. As an option of the `show processes cpu` command, this option displays CPU usage for the designated stack member. Or, as an option of the `command`, this option limits the output of memory statistics to the designated stack member. The unit ID range for the S4810 is from 0 to 11. Refer to Example (stack-unit).
summary	(OPTIONAL) Enter the keyword`summary` to view CPU utilization of processes related to stack-unit processing.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Added the keywords `management-unit [details]`.
Version 7.6.1.0	Introduced on the S-Series.

Example

```
Dell#show processes cpu ?
management-unit         Management Unit
stack-unit              Unit Number
summary                 Summary of CPU utilization
|                       Pipe through a command

Dell#show processes cpu summary

CPU utilization        5Sec    1Min    5Min
-------------------------------------------
UNIT0                    3%      3%      1%
Dell#show processes cpu stack-unit 0

CPUID         5sec            1min            5min
--------------------------------------------------
CORE  0      13.17           11.53             0.00
CORE  2       9.38           12.16             0.00
Overall      11.28           11.84             0.00


CPU utilization of sysdlp for five seconds: 2%/0%; one minute:
3%; five minutes: 1%
PID        Runtime(ms)     Invoked       uSecs     5Sec
1Min     5Min TTY           Process
0xbb773000        5950         595       10000    1.00%
2.25%    1.22%   0            tExcTask
0xbab2a000        4030         403       10000    1.00%
1.33%    0.73%   0             frrpagt
0xbacf3000          10           1       10000    0.00%
0.00%    0.00%   0           F10StkMgr
0xbad0c000         710          71       10000    0.00%
0.00%    0.03%   0               lcMgr
0xbad24000          30           3       10000    0.00%
0.00%    0.00%   0                 dla
0xbad44000          50           5       10000    0.00%
0.00%    0.00%   0           sysAdmTsk
0xbad58000         650          65       10000    0.00%
0.00%    0.00%   0            timerMgr
0xbad6e000          50           5       10000    0.00%
0.00%    0.00%   0                  PM
0xbad85000        1190         119       10000    0.00%
0.00%    0.00%   0                  KP
```

```
0xbad9a000           0           0           0    0.00%
0.00%    0.00%   0              evagt
0xbadb4000          30           3       10000    0.00%
0.00%    0.00%   0                ipc
0xbadc9000          10           1       10000    0.00%
0.00%    0.00%   0          sysReaper
0xbae22000          60           6       10000    0.00%
0.00%    0.02%   0                tme

Dell#show processes cpu management-unit ?
<1-99>                  Number of tasks with highest CPU usage
last 5 seconds
details                 Detail CPU utilization
|                       Pipe through a command
Dell#show processes cpu management-unit details

CPUID         5sec            1min            5min
--------------------------------------------------
CORE  0      11.73           10.79           12.82
CORE  2      11.73           12.05           14.31
Overall      11.73           11.42           13.56

PID        Runtime(ms)     Invoked       uSecs     5Sec
1Min     5Min TTY           Process
Process: system        PID:   0  CPU usage: 5sec - 13.12%
1min - 13.37%  5min - 12.94%  CoreID: 3
Process: sysdlp        PID: 428  CPU usage: 5sec - 3.78%  1min
- 2.56%  5min - 3.40%  CoreID: 0
Process: sysd          PID: 410  CPU usage: 5sec - 1.59%  1min
- 0.96%  5min - 2.50%  CoreID: 2
           TID  Runtime(ms)      Invoked    uSecs     5Sec
1Min     5Min   TTY      Thread
           56         20           2       10000    0.00%
0.00%    0.00%   0              usm
           55         10           1       10000    0.00%
0.00%    0.00%   0          DHCLIENT
           54          0           0           0    0.00%
0.00%    0.00%   0              cms
           53         60           6       10000    0.00%
0.00%    0.00%   0          portmirr
           52          0           0           0    0.00%
0.00%    0.00%   0       cfgDataSync
           51          0           0           0    0.00%
0.00%    0.00%   0         sysCompMgr
           50         50           5       10000    0.00%
0.01%    0.00%   0           statMgr
           49       1010         101       10000    0.05%
0.07%    0.08%   0             sflCp
           48         30           3       10000    0.00%
0.00%    0.00%   0             snmp
           47          0           0           0    0.00%
0.00%    0.00%   0          dpi_cmow
           46          0           0           0    0.00%
0.00%    0.00%   0       dpi_taskcmo

Dell#show processes cpu management-unit details ?
|                       Pipe through a command
Dell#show processes cpu management-unit ?
<1-99>                  Number of tasks with highest CPU usage
last 5 seconds
```

```
details                 Detail CPU utilization
|                       Pipe through a command

Dell#show processes cpu management-unit

CPUID         5sec            1min            5min
--------------------------------------------------
CORE  0       9.54            9.92            12.82
CORE  2      10.74           11.56            14.31
Overall      10.14           10.74            13.56

PID        Runtime(ms)     Invoked       uSecs     5Sec
1Min     5Min TTY           Process
0x00000000       45040        4504       10000   13.12%
13.20%   12.94%   0            system
0x000001ac       25750        2575       10000    2.78%
2.48%    3.40%   0            sysdlp
0x0000019a       10650        1065       10000    0.60%
1.16%    2.50%   0              sysd
0x000003a5         860          86       10000    0.40%
0.22%    0.28%   0             clish
0x000001ad         520          52       10000    0.20%
0.30%    0.16%   0              lacp
0x000004ba         330          33       10000    0.20%
0.36%    0.09%   0             clish
0x000000c9        1240         124       10000    0.20%
0.15%    0.44%   0             nvmgr
0x000000e0         530          53       10000    0.20%
0.12%    0.16%   0              igmp
0x00000132         420          42       10000    0.20%
0.10%    0.13%   0              vrrp
0x0000028d         410          41       10000    0.20%
0.05%    0.12%   0          ovsdbsvr
0x000000a9         200          20       10000    0.20%
0.03%    0.06%   0              arpm
0x00000253         100          10       10000    0.20%
0.02%    0.02%   0               otm
0x00000206         140          14       10000    0.20%
0.02%    0.03%   0            tnlmgr
0x00000012        1290         129       10000    0.00%
0.10%    0.12%   0         mount_mfs
0x0000024d         400          40       10000    0.00%
0.08%    0.14%   0              xstp
```

Related Commands

show hardware layer2 acl — displays Layer 2 ACL data for the selected stack member and stack member port-pipe.

show hardware layer3 — displays Layer 3 ACL or QoS data for the selected stack member and stack member port-pipe.

show hardware stack-unit — displays the data plane or management plane input and output statistics of the designated component of the designated stack member.

show hardware system-flow — displays Layer 3 ACL or QoS data for the selected stack member and stack member port-pipe.

show interfaces stack-unit — displays information on all interfaces on a specific S-Series stack member.

show processes memory (S-Series) — displays CPU usage information based on processes running in an S-Series.

show processes ipc flow-control

Display the single window protocol queue (SWPQ) statistics.

S6000

Syntax `show processes ipc flow-control [cp]`

Syntax `show processes ipc flow-control [cp | rp1 | rp2 | stack-unit]`

Parameters

cp	(OPTIONAL) Enter the keyword `cp` to view the control processor's SWPQ statistics.

Parameters

cp	(OPTIONAL) Enter the keyword `cp` to view the control processor's SWPQ statistics.
rp1	(OPTIONAL) Enter the keyword `rp1` to view the Control Processor's SWPQ statistics on Route Processor 1.*
rp2	(OPTIONAL) Enter the keyword `rp2` to view the Control Processor's SWPQ statistics on Route Processor 2.*
stack-unit	(OPTIONAL) Enter the keyword `stack-unit` followed by the stack-unit number to view the Control Processor's SWPQ statistics on the specified stack-unit.*

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

Field	Description
Source QID /Tx Process	Source Service Identifier
Destination QID/Rx Process	Destination Service Identifier
Cur Len	Current number of messages enqueued
High Mark	Highest number of packets in the queue at any time
#of to / Timeout	Timeout count
#of Retr /Retries	Number of retransmissions
#msg Sent/Msg Sent/	Number of messages sent
#msg Ackd/Ack Rcvd	Number of messages acknowledged
Retr /Available Retra	Number of retries left
Total/ Max Retra	Number of retries allowed

Important Points:

- The SWP provides flow control-based reliable communication between the sending and receiving software tasks.
- A sending task enqueues messages into the SWP queue3 for a receiving task and waits for an acknowledgement.
- If no response is received within a defined period of time, the SWP timeout mechanism resubmits the message at the head of the FIFO queue.
- After retrying a defined number of times, the `SWP-2-NOMORETIMEOUT` timeout message is generated.
- In the S-Series example, a retry (Retries) value of zero indicates that the SWP mechanism reached the maximum number of retransmissions without an acknowledgement.

Example (S-Series)

```
Dell#show processes ipc flow-control ?
cp                       Control Processor
|                        Pipe through a command
```

show processes memory

Display memory usage information based on processes running in the S-Series or Z-Series system.

S6000

Syntax

```
show processes memory {management-unit | stack unit {unit-id |
all | summary}}
```

Parameters

management-unit	Enter the keyword `management-unit` for CPU memory usage of the stack management unit.
stack unit *unit id*	Enter the keyword `stack unit` then a stack unit ID of the member unit for which to display memory usage on the forwarding processor. The range is from 0 to 7.
all	Enter the keyword `all` for detailed memory usage on all stack members.
summary	Enter the keyword `summary` for a brief summary of memory availability and usage on all stack members.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.7.1.0	Added the `management-unit` option.
Version 7.6.1.0	Introduced on the S-Series.

Usage Information

show processes memory output Field	Description
Total:	Total system memory available

`show processes memory output` Field	Description
MaxUsed:	Total maximum memory used ever (history indicated with time stamp)
CurrentUsed:	Total memory currently in use
CurrentFree:	Total system memory available
SharedUsed:	Total used shared memory
SharedFree:	Total free shared memory
PID	Process ID
Process	Process Name
ResSize	Actual resident size of the process in memory
Size	Process test, stack, and data size
Allocs	Total dynamic memory allocated
Frees	Total dynamic memory freed
Max	Maximum dynamic memory allocated
Current	Current dynamic memory in use

The output for the `show process memory` command displays the memory usage statistics running on CP part (sysd) of the system. The sysd is an aggregate task that handles all the tasks running on S-Series' CP.

For the S-Series, the output of the `show memory` command and this command differ based on which FTOS processes are counted.

- In the `show memory` output, the memory size is equal to the size of the application processes.
- In the output of this command, the memory size is equal to the size of the application processes plus the size of the system processes.

Example

```
Dell#show processes memory stack-unit 0
Total: 268435456, MaxUsed: 2420244, CurrentUsed: 2420244,
CurrentFree:
266015212
TaskName TotalAllocated TotalFreed MaxHeld CurrentHolding
tme      435406         397536     54434   37870
ipc       16652              0     16652   16652
timerMgr  33304              0     33304   33304
sysAdmTsk 33216              0     33216   33216
tFib4   1943960              0   1943960 1943960
aclAgent  90770          16564     74206   74206
ifagt_1   21318          16564     21318    4754
dsagt      6504              0      6504    6504
MacAgent 269778              0    269778  269778
```

Example (management-unit)

```
Dell#show processes management-unit

Total      : 151937024,   MaxUsed : 111800320 [2/25/2008
4:18:53]
CurrentUsed: 98848768, CurrentFree: 53088256

SharedUsed : 13007848, SharedFree : 7963696
PID Process      ResSize     Size Allocs Frees   Max Current
337 KernLrnAgMv 117927936       0      0     0      0       0
331 vrrp          5189632  249856  50572     0  50572   50572
323 frrp          5206016  241664 369238     0 369238  369238
322 xstp          7430144 2928640  38328     0  38328   38328
321 pim           5267456  823296  62168     0  62168   62168
314 igmp          4960256  380928  18588 16564  18588    2024
313 mrtm          6742016 1130496  72758     0  72758   72758
308 l2mgr        5607424   552960 735214 380972 619266 354242
301 l2pm       5001216   167936 1429522 1176044 286606 253478
298 arpm          4628480  217088  71092  33128  71092  37964
294 ospf          5468160  503808 724204 662560  78208  61644
288 dsm           6778880 1159168  39490  16564  39490  22926
287 rtm           5713920  602112 442280 198768 376024 243512
284 rip           4562944  258048    528      0    528    528
281 lacp          4673536  266240 221060      0 221060 221060
277 ipm1          4837376  380928  83788      0  83788  83788
273 acl           5005312  512000 239564 149076 123616  90488
272 topoDPC     117927936       0      0      0      0      0
271 bcmNHOP     117927936       0      0      0      0      0
270 bcmDISC     117927936       0      0      0      0      0
269 bcmATP-RX   117927936       0      0      0      0      0
268 bcmATP-TX   117927936       0      0      0      0      0
267 bcmSTACK    117927936       0      0      0      0      0
266 bcmRX       117927936       0      0      0      0      0
265 bcmLINK.0   117927936       0      0      0      0      0
!----------- output truncated --------------!
```

show software ifm

Display interface management (IFM) data.

S6000

Syntax

```
show software ifm {clients [summary] | ifagt number | ifcb
interface | stack-unit unit-ID | trace-flags}
```

Parameters

clients	Enter the keyword `clients` to display IFM client information.
summary	(OPTIONAL) Enter the keyword `summary` to display brief information about IFM clients.
ifagt *number*	Enter the keyword `ifagt` then the number of an interface agent to display software pipe and IPC statistics.
ifcb *interface*	Enter the keyword `ifcb` then one of the following interface IDs then the slot/port information to display interface control block information for that interface:

- For a Port Channel interface, enter the keyword `port-channel` then a number: The range is from 1 to 128.
- For a 10G Ethernet interface, enter the keyword `TenGigabitEthernet`.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE`.

stack-unit *unit-ID*	Enter the keyword `stack-unit` then the stack member number to display IFM information for that unit. The range is from 0 to 1. **NOTE:** This option is only available on the S-Series.
trace-flags	Enter the keyword `trace-flags` to display IFM information for internal trace flags.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 7.6.1.0	Introduced for the C-Series and S-Series.

Example

```
Dell#show software ifm clients summary
ClntType Inst svcMask subSvcMask tlvSvcMask tlvSubSvc swp
IPM      0  0x00000000 0x00000000 0x90ff71f3 0x021e0e81 31
RTM      0  0x00000000 0x00000000 0x800010ff 0x01930000 43
VRRP     0  0x00000000 0x00000000 0x803330f3 0x00400000 39
L2PM     0  0x00000000 0x00000000 0x87ff79ff 0x0e032200 45
ACL      0  0x00000000 0x00000000 0x867f50c3 0x000f0218 44
OSPF     0  0x00000dfa 0x00400098 0x00000000 0x00000000 0
PIM      0  0x000000f3 0x00030000 0x00000000 0x00000000 0
IGMP     0  0x000e027f 0x00000000 0x00000000 0x00000000 0
SNMP     0  0x00000000 0x00000000 0x800302c0 0x00000002 30
EVTTERM  0  0x00000000 0x00000000 0x800002c0 0x00000000 29
MRTM     0  0x00000000 0x00000200 0x81f7103f 0x00000000 38
DSM      0  0x00000000 0x00000000 0x80771003 0x00000000 32
```

```
LACP     0 0x00000000 0x00000000 0x8000383f 0x00000000 35
DHCP     0 0x00000000 0x00000000 0x800000c2 0x0000c000 37
V6RAD    0 0x00000433 0x00030000 0x00000000 0x00000000 0
Unidentified Client0 0x006e0002 0x00000000 0x00000000
0x00000000 0
Dell#
```

show system

Display the status of all stack members or a specific member.

S6000

Syntax

```
show system [brief | stack-unit unit-id [disabled—ports] |
stack-ports {status | topology}]
```

Parameters

brief	(OPTIONAL) Enter the keyword `brief` to view an abbreviated list of system information.
stack-unit *unit-id*	(OPTIONAL) Enter the keywords `stack-unit` then the stack member ID for information on that stack member. The unit ID range for the S6000 is from 0 to 5.
stack-unit *unit-id* disabled-ports	(OPTIONAL) Enter the keyword `stack-unit` followed by stack member ID for the information on that stack number and followed by the disabled-ports for the information on the ports that are disabled.
stack-ports *status* | *topology*	(OPTIONAL) Enter the keywords `stack-ports` for information about the status or topology of the S4810 stack ports.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for the `disabled-ports` parameter .
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.4	The `brief` parameter no longer displays the current Reload mode. To display Reload mode, use the `show reload-type` command. Modified the `show system stack-unit` command output to support Piece Part ID (PPID).
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	The Boot Flash field displays the code level for boot code 2.8.1.1 and newer, while older boot codes display as "Present".
Version 7.7.1.0	Added Master Priority field.
Version 7.6.1.0	Introduced on the S-Series.

Example (show system stack unit – disabled ports)

```
Dell#show system stack-unit 0 disabled-ports
Disabled ports in stack-unit 0
          Disabled
             52
             56
             60
```

Example (show system brief)

```
Dell#show system brief

Stack MAC : 90:b1:1c:f4:9b:79
Reload-Type                :   normal-reload [Next boot :
normal-reload]

--  Stack Info  --
Unit  UnitType     Status         ReqTyp
CurTyp          Version     Ports
---------------------------------------------------------------
---------------------
  0   Management   online         S6000
S6000           9-4(0-168)  128
  1   Member       not present
  2   Member       not present
  3   Member       not present
  4   Member       not present
  5   Member       not present

--  Power Supplies  --
Unit   Bay   Status       Type    FanStatus   FanSpeed(rpm)
---------------------------------------------------------------
------------
  0     0    down         UNKNOWN down        0
  0     1    up           AC      up          6600

--  Fan  Status  --
Unit Bay   TrayStatus  Fan0    Speed   Fan1    Speed
---------------------------------------------------------------
---------------------
0    0     up          up      7072    up      7072
0    1     up          up      7021    up      7072
0    2     up          up      7021    up      7021

Speed in RPM
```

Example (S6000)

```
Dell#show system

Stack MAC : 90:b1:1c:f4:9b:79
Reload-Type                :   normal-reload [Next boot :
normal-reload]

--  Unit 0 --
Unit Type                  : Management Unit
Status                     : online
Next Boot                  : online
Required Type              : S6000 - 32-port TE/FG (SI)
Current Type               : S6000 - 32-port TE/FG (SI)
Master priority            : 0
Hardware Rev               : 4.0
Num Ports                  : 128
Up Time                    : 19 min, 19 sec
Dell Networking OS Version : 9-4(0-168)
Jumbo Capable              : yes
POE Capable                : no
FIPS Mode                  : disabled
Burned In MAC              : 90:b1:1c:f4:9b:79
No Of MACs                 : 3

--  Power Supplies  --
Unit   Bay   Status       Type    FanStatus   FanSpeed(rpm)
---------------------------------------------------------------
------------
  0     0    down         UNKNOWN down        0
  0     1    up           AC      up          6600

--  Fan  Status  --
Unit Bay   TrayStatus  Fan0    Speed   Fan1    Speed
---------------------------------------------------------------
---------------------
0    0     up          up      7072    up      7021
0    1     up          up      7021    up      7123
0    2     up          up      7072    up      7021

Speed in RPM

--  Unit 1 --
Unit Type                  : Member Unit
Status                     : not present

--  Unit 2 --
Unit Type                  : Member Unit
Status                     : not present

--  Unit 3 --
Unit Type                  : Member Unit
Status                     : not present

--  Unit 4 --
Unit Type                  : Member Unit
Status                     : not present

--  Unit 5 --
Unit Type                  : Member Unit
Status                     : not present
```

Example (S4810)

```
Dell#show system stack-unit 0
```

```
--  Unit 0 --
Unit Type                   : Management Unit
Status                      : online
Next Boot                   : online
Required Type               : S6000 - 32-port TE/FG (SI)
Current Type                : S6000 - 32-port TE/FG (SI)
Master priority             : 0
Hardware Rev                : 4.0
Num Ports                   : 128
Up Time                     : 21 min, 8 sec
Dell Networking OS Version : 9-4(0-168)
Jumbo Capable               : yes
POE Capable                 : no
FIPS Mode                   : disabled
Boot Flash                  : 3.1.1.2
Boot Selector               : 3.1.0.2
Memory Size                 : 3203911680 bytes
Temperature                 : 36C
Voltage                     : ok
Serial Number               : NA
Part Number                 : 08YWFG     Rev A00
Vendor Id                   : DL
Date Code                   : 26092013
Country Code                : CN
Piece Part ID               : CN-08YWFG-28298-39Q-0015
PPID Revision               : A00
Service Tag                 : 24N1VS1
Expr Svc Code               : 463 414 838 5
Auto Reboot                 : disabled
Burned In MAC               : 90:b1:1c:f4:9b:79
No Of MACs                  : 3

--  Power Supplies  --
Unit    Bay   Status        Type     FanStatus   FanSpeed(rpm)
---------------------------------------------------------------
------------
  0      0     down          UNKNOWN     down        0
  0      1     up            AC          up          6600

--  Fan  Status  --
Unit Bay   TrayStatus  Fan0    Speed   Fan1    Speed
---------------------------------------------------------------
---------------------
0     0     up          up      6971    up      7021
0     1     up          up      7021    up      7021
0     2     up          up      7021    up      7021

Speed in RPM
```

Related Commands

- show version – displays the Dell Networking OS version.
- show hardware stack-unit – displays the data plane and management plane input and output statistics of a particular stack member.

show tech-support

Display a collection of data from other `show` commands, necessary for Dell Networking technical support to perform troubleshooting on S-Series or Z-Series switches.

S6000

Syntax

```
show tech-support [stack-unit unit-id | page]
```

Parameters

stack-unit	(OPTIONAL) Enter the keywords `stack-unit` to view CPU memory usage for the stack member designated by unit-id. The unit ID range for the S6000 is from 0 to 7.
page	(OPTIONAL) Enter the keyword `page` to view 24 lines of text at a time. Press the SPACE BAR to view the next 24 lines. Press the ENTER key to view the next line of text. When using the pipe command (|), enter one of these keywords to filter command output. For details about filtering commands, refer to CLI Basics.
save	Enter the keyword `save` to save the command output. `flash`: Save to local flash drive (`flash://filename`. A maximum of 20 characters.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced `save` to the file options.
Version 7.6.1.0	Introduced on the S-Series.

Usage Information

Without the `page or stack-unit` option, the command output is continuous. To interrupt the command output, use Ctrl-z.

The `save` option works with other filtering commands. This allows you to save specific information of a `show` command. The `save` entry must always be the last option. For example: `Dell#show tech-support |grep regular-expression`

```
|except regular-expression | find regular-expression | save
flash://result
```

This display output is an accumulation of the same information that is displayed when you execute one of the following `show` commands:

- `show version`
- `show clock`
- `show running-config`
- `show system stack-ports`
- `show interfaces`
- `show process memory`
- `show process cpu`
- `show file system`
- `show system`
- `show environment`
- `show ip traffic`
- `show ip management route`
- `show ip route summary`
- `show Inventory`
- `show log summary`
- `show command-history (last 20 commands)`
- `show log`

Example (S-Series)

```
Dell#show tech-support ?
page        Page through output
stack-unit  Unit Number
|           Pipe through a command
<cr>
Dell#show tech-support stack-unit 1 ?
|           Pipe through a command
<cr>
Dell#show tech-support stack-unit 1 | ?
except      Show only text that does not match a pattern
find        Search for the first occurrence of a pattern
grep        Show only text that matches a pattern
no-more     Don't paginate output
save        Save output to a file

Dell#show tech-support stack-unit 1 | save ?
flash:      Save to local file system (flash://filename (max 20
chars) )

Dell#show tech-support stack-unit 1 | save flash://LauraSave
Start saving show command report .......
Dell#

Dell#dir
Directory of flash:
1  drw-  16384   Jan 01 1980 00:00:00 +00:00 .
2  drwx  1536    Jul 13 1996 02:38:06 +00:00 ..
3  d---  512     Nov 20 2007 15:46:44 +00:00 ADMIN_DIR
```

Example (S-Series)

```
Dell#show tech-support stack-unit 0

----------------------------------- show version
-------------------------------
Dell Real Time Operating System Software
Dell Operating System Version:  2.0
Dell Application Software Version:  9-4(0-168)
Copyright (c) 1999-2014 by Dell Inc. All Rights Reserved.
Build Time: Sun Mar 23 22:17:49 PDT 2014
Build Path: /work.local/build/buildSpaces/build01/E9-4-0/SW/SRC
Dell Networking OS uptime is 32 minute(s)

System image file is "s6000"

System Type: S6000
Control Processor: Intel Centerton with 3203911680 bytes of
memory, core(s) 2.

16G bytes of boot flash memory.

  1 32-port TE/FG (SI)
64 Ten GigabitEthernet/IEEE 802.3 interface(s)
16 Forty GigabitEthernet/IEEE 802.3 interface(s)

------------------------------------ show clock
-------------------------------
18:10:52.864 UTC Tue Mar 25 2014

----------------------------------- show running-config
------------------------
Current Configuration ...
! Version 9-4(0-168)
! Last configuration change at Tue Mar 25 17:43:06 2014 by
admin
!
boot system stack-unit 0 primary tftp://10.16.127.146/s6000
boot system stack-unit 0 secondary system: B:
boot system stack-unit 0 default system: A:
!
redundancy auto-synchronize full
redundancy disable-auto-reboot stack-unit
!
redundancy disable-auto-reboot stack-unit 0
redundancy disable-auto-reboot stack-unit 1
redundancy disable-auto-reboot stack-unit 2
redundancy disable-auto-reboot stack-unit 3
redundancy disable-auto-reboot stack-unit 4
redundancy disable-auto-reboot stack-unit 5
!
hardware watchdog stack-unit 0
hardware watchdog stack-unit 1
hardware watchdog stack-unit 2
hardware watchdog stack-unit 3
hardware watchdog stack-unit 4
hardware watchdog stack-unit 5
!
```

Related Commands

ssh-peer-stack-unit

Open an SSH connection to the peer stack-unit.

Syntax

```
ssh-peer-stack-unit [-l username]
```

Parameters

-l *username*	(OPTIONAL) Enter the keyword `-l` then your user name. The default is the user name associated with the terminal.

Defaults

Not configured.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.11.1	Introduced on the S-Series.

telnet

Connect through Telnet to a server. The Telnet client and server in Dell Networking support IPv4 and IPv6 connections. You can establish a Telnet session directly to the router or a connection can be initiated from the router.

NOTE: The Telnet server and client are VRF-aware. Using the `vrf` parameter in this command, you can make a Telnet server or client to listen to a specific VRF. This capability enables a Telent server or client to look up the correct routing table and establish a connection.

S6000

Syntax

```
telnet {host | ip-address | ipv6-address prefix-length | vrf
vrf instance name } [/source-interface]
```

```
telnet {host | ip-address | ipv6-address prefix-length} [/
source-interface]
```

Parameters

host	Enter the name of a server.
ip-address	Enter the IPv4 address in dotted decimal format of the server.
ipv6-address prefix-length	Enter the IPv6 address in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
vrf instance	(Optional) Enter the keyword `vrf` then the VRF instance name.
source-interface	(OPTIONAL) Enter the keywords `/source-interface` then the interface information to include the source interface. Enter the following keywords and slot/port or number information: • For a Loopback interface, enter the keyword `loopback` then a number from zero (0) to 16383. • For the Null interface, enter the keyword `null` then 0. • For a Port Channel interface, enter the keyword `port-channel` then a number. The range is from 1 to 128. • For Tunnel interface types, enter the keyword `tunnel` then the slot/ port information. The range is from 1 to 16383. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

Not configured.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810. Added support for *source-interface* for link-local IPv6 addressing.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.2.1.0	Introduced on the E-Series ExaScale (IPv6). Increased the number of VLANs on ExaScale to 4094 (was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale (IPv4).
Version 7.9.1.0	Introduced VRF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series and added support for IPv6 address on the E-Series only.

Example

```
Dell(conf)#do telnet vrf vrf1 10.10.10.2
```

telnet-peer-stack-unit

Open a Telnet connection to the peer stack unit.

Syntax

```
telnet-peer-stack-unit
```

Defaults Not configured.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.11.1	Introduced on the S-Series.

terminal length

Configure the number of lines displayed on the terminal screen.

S6000

Syntax

```
terminal length screen-length
```

Parameters

screen-length	Enter a number of lines. Entering zero causes the terminal to display without pausing. The range is from 0 to 512.

Defaults

24 lines

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

traceroute

View a packet's path to a specific device.

S6000

Syntax

```
traceroute {host | vrf instance | ip-address | ipv6-address}
```

```
traceroute {host | ip-address | ipv6-address}
```

Parameters

host	Enter the name of device.
ip-address	Enter the IP address of the device in dotted decimal format.
ipv6-address	Enter the IPv6 address, in the x:x:x:x::x format, to which you are testing connectivity. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.

Defaults

- Timeout = **5 seconds**
- Probe count = **3**
- 30 hops max
- 40 byte packet size
- UDP port = **33434**

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.2.1.0	Introduced on the E-Series ExaScale with IPv6.
Version 8.1.1.0	Introduced on the E-Series ExaScale (IPv4 only).
Version 7.9.1.0	Introduced VRF.
Version 7.6.1.0	Added support for the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for IPv6 address on the E-Series.
E-Series	Original command.

Usage Information

When you enter the `traceroute` command without specifying an IP address (Extended Traceroute), you are prompted for a target and source IP address, timeout (in seconds) (default is **5**), a probe count (default is **3**), minimum TTL (default is **1**), maximum TTL (default is **30**), and port number (default is **33434**). To keep the default setting for those parameters, press the ENTER key.

For IPv6, you are prompted for a minimum hop count (default is **1**) and a maximum hop count (default is **64**).

Example (IPv4)

```
Dell#traceroute www.Dell Networking.com

Translating "www.Dell Networking.com"...domain server
(10.11.0.1) [OK]
Type Ctrl-C to abort.

-----------------------------------------------
Tracing the route to www.Dell Networking.com (10.11.84.18),
30 hops max, 40 byte packets
-----------------------------------------------

TTL Hostname      Probe1     Probe2     Probe3
1   10.11.199.190 001.000 ms 001.000 ms 002.000 ms
2   gwegress-sjc-02.Dell Networking.com (10.11.30.126) 005.000
ms 001.000 ms 001.000 ms
3   fw-sjc-01.Dell Networking.com (10.11.127.254) 000.000 ms
000.000 ms 000.000 ms
4   www.Dell Networking.com (10.11.84.18) 000.000 ms 000.000
ms 000.000 ms
FTOS#
```

Example (IPv6)

```
Dell#traceroute 100::1

Type Ctrl-C to abort.

-----------------------------------------------
Tracing the route to 100::1, 64 hops max, 60 byte packets
-----------------------------------------------
Hops Hostname Probe1    Probe2    Probe3
1    100::1 000.000 ms 000.000 ms 000.000 ms

FTOS#traceroute 3ffe:501:ffff:100:201:e8ff:fe00:4c8b

Type Ctrl-C to abort.

-----------------------------------------------
Tracing the route to 3ffe:501:ffff:100:201:e8ff:fe00:4c8b,
64 hops max, 60 byte packets
-----------------------------------------------
Hops Hostname  Probe1   Probe2    Probe3
 1  3ffe:501:ffff:100:201:e8ff:fe00:4c8b
             000.000 ms 000.000 ms 000.000 ms
Dell#
```

Related Commands

ping — tests the connectivity to a device.

undebug all

Disable all debug operations on the system.

S6000

Syntax	`undebug all`
Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command

virtual-ip

Configure a virtual IP address for the active management interface. You can configure virtual addresses both for IPv4 and IPv6 independently.

S6000

Syntax	`virtual-ip {`*`ipv4-address`*`	`*`ipv6-address`*`}` To return to the default, use the `no virtual-ip {`*`ipv4-address`*`	`*`ipv6-address`*`}` command.
Parameters	

ipv4-address	Enter the IP address of the active management interface in a dotted decimal format (A.B.C.D.).
ipv6-address	Enter an IPv6 address of the active management interface, in the x:x:x:x::x format.

NOTE: The :: notation specifies successive hexadecimal fields of zeros.

Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information	You can configure both IPv4 and IPv6 virtual addresses simultaneously, but only one of each. Each time this command is issued, it replaces the previously configured address of the same family, IPv4 or IPv6. The `no virtual-ip` command takes an address/prefix-length argument, so that the desired address only is removed. If you enter the `no virtual-ip` command without any specified address, then both IPv4 and IPv6 virtual addresses are removed.
Related Commands	ip address — assigns a primary and secondary IP address to the interface.

write

Copy the current configuration to either the startup-configuration file or the terminal.

S6000

Syntax	`write {memory | terminal}`
Parameters	

memory	Enter the keyword `memory` to copy the current running configuration to the startup configuration file. This command is similar to the `copy running-config startup-config` command.

terminal	Enter the keyword `terminal` to copy the current running configuration to the terminal. This command is similar to the `show running-config` command.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series	Original command.

Usage Information

The `write memory` command saves the running-configuration to the file labeled startup-configuration. When using a LOCAL CONFIG FILE other than the startup-config not named “startup-configuration” (for example, you used a specific file during the `boot config` command), the running-config is not saved to that file; use the `copy` command to save any running-configuration changes to that local file.

5

802.1X

An authentication server must authenticate a client connected to an 802.1X switch port. Until the authentication, only extensible authentication protocol over LAN (EAPOL) traffic is allowed through the port to which a client is connected. After authentication is successful, normal traffic passes through the port.

The Dell Networking operating software supports remote authentication dial-in service (RADIUS) and active directory environments using 802.1X Port Authentication.

Important Points to Remember

Dell Networking operating software limits network access for certain users by using virtual local area network (VLAN) assignments. 802.1X with VLAN assignment has these characteristics when configured on the switch and the RADIUS server.

- 802.1X is supported on the S6000 platform.
- On all platforms, if the primary RADIUS server becomes unresponsive, the authenticator begins using a secondary RADIUS server, if configured.
- If no VLAN is supplied by the RADIUS server or if you disable 802.1X authorization, the port configures in its access VLAN after successful authentication.
- If you enable 802.1X authorization but the VLAN information from the RADIUS server is not valid, the port returns to the Unauthorized state and remains in the configured access VLAN. This safeguard prevents ports from appearing unexpectedly in an inappropriate VLAN due to a configuration error. Configuration errors create an entry in Syslog.
- If you enable 802.1X authorization and all information from the RADIUS server is valid, the port is placed in the specified VLAN after authentication.
- If you enable port security on an 802.1X port with VLAN assignment, the port is placed in the RADIUS server assigned VLAN.
- If you disable 802.1X on the port, it returns to the configured access VLAN.
- When the port is in the Force Authorized, Force Unauthorized, or Shutdown state, it is placed in the configured access VLAN.
- If an 802.1X port is authenticated and put in the RADIUS server assigned VLAN, any change to the port access VLAN configuration does not take effect.
- The 802.1X with VLAN assignment feature is not supported on trunk ports, dynamic ports, or with dynamic-access port assignment through a VLAN membership.

debug dot1x

Display 802.1X debugging information.

S6000

Syntax

```
debug dot1x [all | auth-pae-fsm | backend-fsm | eapol-pdu]
[interface interface]
```

Parameters

all	Enable all 802.1X debug messages.
auth-pae-fsm	Enable authentication PAE FSM debug messages.
backend-fsm	Enable backend FSM debug messages.
eapol-pdu	Enable the EAPOL frame trace and related debug messages.
interface *interface*	Restricts the debugging information to an interface.

Defaults Disabled

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.1.0	Introduced on the C-Series and S-Series.

dot1x auth-fail-vlan

Configure an authentication failure VLAN for users and devices that fail 802.1X authentication.

S6000

Syntax

```
dot1x auth-fail-vlan vlan-id [max-attempts number]
```

To delete the authentication failure VLAN, use the `no dot1x auth-fail-vlan` *`vlan-id`* `[max-attempts` *`number`*`]` command.

Parameters

vlan-id	Enter the VLAN Identifier. The range is from 1 to 4094.
max-attempts *number*	(OPTIONAL) Enter the keywords `max-attempts` followed number of attempts desired before authentication fails. The range is from 1 to 5. The default is **3**.

Defaults

3 attempts

Command Modes

CONFIGURATION (*conf-if-interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.1.0	Introduced on the C-Series and S-Series.

Usage Information

If the host responds to 802.1X with an incorrect login/password, the login fails. The switch attempts to authenticate again until the maximum attempts configured is reached. If the authentication fails after all allowed attempts, the interface moves to the authentication failed VLAN.

After the authentication VLAN is assigned, the port-state must be toggled to restart authentication. Authentication occurs at the next reauthentication interval (`dot1x reauthentication`).

Related Commands

- dot1x port-control — Enable port control on an interface
- dot1x guest-vlan — Configure a guest VLAN for limited access users or for devices that are not 802.1X capable.
- show dot1x interface — Display the 802.1X configuration of an interface.

dot1x auth-server

Configure the authentication server to RADIUS.

S6000

Syntax	`dot1x auth-server radius`
Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x auth-type mab-only

To authenticate a device with MAC authentication bypass (MAB), only use the host MAC address.

S6000

Syntax	`dot1x auth-type mab-only`
Defaults	Disabled
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.1	Introduced on the C-Series and S-Series.

Usage Information

The prerequisites for enabling MAB-only authentication on a port are:

- Enable 802.1X authentication globally on the switch and on the port (the `dot1x authentication` command).
- Enable MAC authentication bypass on the port (the `dot1x mac-auth-bypass` command).

In MAB-only authentication mode, a port authenticates using the host MAC address even though 802.1xauthentication is enabled. If the MAB-only authentication fails, the host is placed in the guest VLAN (if configured).

To disable MAB-only authentication on a port, enter the `no dot1x auth-type mab-only` command.

Related Commands

dot1x mac-auth-bypass — Enable MAC authentication bypass.

dot1x authentication (Configuration)

Enable dot1x globally. Enable dot1x both globally and at the interface level.

S6000

Syntax

`dot1x authentication`

To disable dot1x on a globally, use the `no dot1x authentication` command.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series TeraScale.

Related Commands

dot1x authentication (Interface) — Enable dot1x on an interface.

dot1x authentication (Interface)

Enable dot1x on an interface. Enable dot1x both globally and at the interface level.

S6000

Syntax

`dot1x authentication`

To disable dot1x on an interface, use the `no dot1x authentication` command.

Defaults

Disabled

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands	dot1x authentication (Configuration) — Enable dot1x globally.

dot1x guest-vlan

Configure a guest VLAN for limited access users or for devices that are not 802.1X capable.

S6000

Syntax `dot1x guest-vlan vlan-id`

To disable the guest VLAN, use the `no dot1x guest-vlan vlan-id` command.

Parameters

vlan-id	Enter the VLAN Identifier. The range is from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION (*conf-if-interface-slot/port*)

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series, E-Series, and S-Series.

Usage Information 1X authentication is enabled when an interface is connected to the switch. If the host fails to respond within a designated amount of time, the authenticator places the port in the guest VLAN.

If a device does not respond within 30 seconds, it is assumed that the device is not 802.1X capable. Therefore, a guest VLAN is allocated to the interface and authentication, for the device, occurs at the next reauthentication interval (`dot1x reauthentication`).

If the host fails authentication for the designated number of times, the authenticator places the port in authentication failed VLAN (`dot1x auth-fail-vlan`).

NOTE: You can create the Layer 3 portion of a guest VLAN and authentication fail VLANs regardless if the VLAN is assigned to an interface or not. After an interface is assigned a guest VLAN (which has an IP address), routing through the guest VLAN is the same as any other traffic. However, the interface may join/leave a VLAN dynamically.

Related Commands

- dot1x auth-fail-vlan — Configure an authentication failure VLAN.
- dot1x reauthentication — Enable periodic re-authentication of the client.
- dot1x reauth-max — Configure the maximum number of times to re-authenticate a port before it becomes unauthorized

dot1x host-mode

Enable single-host or multi-host authentication.

S6000

Syntax

```
dot1x host-mode {single-host | multi-host | multi-auth}
```

Parameters

single-host	Enable single-host authentication.
multi-host	Enable multi-host authentication.
multi-auth	Enable multi-supplicant authentication.

Defaults **single-host**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.1.0	Added the `multi-auth` option on the C-Series and S-Series.
Version 8.3.2.0	Added the `single-host` and `multi-host` options on the C-Series, E-Series, and S-Series.

Usage Information

- Single-host mode authenticates only one host per authenticator port and drops all other traffic on the port.
- Multi-host mode authenticates the first host to respond to an Identity Request and then permits all other traffic on the port.
- Multi-supplicant mode authenticates every device attempting to connect to the network on the authenticator port.

Related Commands

show dot1x interface — Display the 802.1X configuration of an interface.

dot1x mac-auth-bypass

Enable MAC authentication bypass. If 802.1X times out because the host did not respond to the Identity Request frame, Dell Networking OS attempts to authenticate the host based on its MAC address.

S6000

Syntax

`dot1x mac-auth-bypass`

To disable MAC authentication bypass on a port, use the `no dot1x mac-auth-bypass` command.

Defaults

Disabled

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.4.1.0	Introduced on the C-Series and S-Series.

Usage Information To disable MAC authentication bypass on a port, enter the no dot1x mac-auth-bypass command.

dot1x max-eap-req

Configure the maximum number of times an extensive authentication protocol (EAP) request is transmitted before the session times out.

S6000

Syntax `dot1x max-eap-req number`

To return to the default, use the `no dot1x max-eap-req` command.

Parameters

number	Enter the number of times an EAP request is transmitted before a session time-out. The range is from 1 to 10. The default is **2**.

Defaults **2**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x max-supplicants

Restrict the number of supplicants that can be authenticated and permitted to access the network through the port. This configuration is only takes effect in Multi-auth mode.

S6000

Syntax

```
dot1x max-supplicants number
```

Parameters

number	Enter the number of supplicants that can be authenticated on a single port in Multi-auth mode. The range is from 1 to 128. The default is **128**.

Defaults

128 hosts can be authenticated on a single authenticator port.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.1.0	Introduced on the C-Series and S-Series.

Related Commands

dot1x host-mode — Enable single-host or multi-host authentication

dot1x port-control

Enable port control on an interface.

S6000

Syntax

```
dot1x port-control {force-authorized | auto | force-
unauthorized}
```

Parameters

force-authorized	Enter the keywords `force-authorized` to forcibly authorize a port.
auto	Enter the keyword `auto` to authorize a port based on the 802.1X operation result.
force-unauthorized	Enter the keywords `force-unauthorized` to forcibly de-authorize a port.

Defaults none

Command Modes Auto

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

The authenticator completes authentication only when `port-control` is set to `auto`.

dot1x quiet-period

Set the number of seconds that the authenticator remains quiet after a failed authentication with a client.

S6000

Syntax

`dot1x quiet-period` *`seconds`*

To disable quiet time, use the `no dot1x quiet-time` command.

Parameters

seconds	Enter the number of seconds. The range is from 1 to 65535. The default is **60**.

Defaults	**60** seconds
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x reauthentication

Enable periodic reauthentication of the client.

S6000

Syntax

```
dot1x reauthentication [interval seconds]
```

To disable periodic reauthentication, use the `no dot1x reauthentication` command.

Parameters

interval *seconds*	(Optional) Enter the keyword `interval` then the interval time, in seconds, after which reauthentication is initiated. The range is from 1 to 31536000 (one year). The default is **3600** (1 hour).

Defaults	**3600** seconds (1 hour)
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x reauth-max

Configure the maximum number of times a port can re-authenticate before the port becomes unauthorized.

S6000

Syntax

`dot1x reauth-max number`

To return to the default, use the `no dot1x reauth-max` command.

Parameters

number	Enter the permitted number of re-authentications. The range is from 1 to 10. The default is **2**.

Defaults

2

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.

Version 7.4.1.0	Introduced on the E-Series.

dot1x server-timeout

Configure the amount of time after which exchanges with the server time-out.

S6000

Syntax

`dot1x server-timeout seconds`

To return to the default, use the `no dot1x server-timeout` command.

Parameters

seconds	Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.

Defaults

30 seconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

When you configure the `dot1x server-timeout` value, take into account the communication medium used to communicate with an authentication server and the number of RADIUS servers configured. Ideally, the `dot1x server-timeout` value (in seconds) is based on the configured RADIUS-server timeout and retransmit values and calculated according to the following formula: `dot1x server-timeout` *seconds* > (radius-server retransmit *seconds* + 1) * radius-server timeout *seconds*.

Where the default values are as follows: `dot1x server-timeout` (30 seconds), radius-server retransmit (3 seconds), and radius-server timeout (5 seconds).

For example:

```
Dell(conf)#radius-server host 10.11.197.105 timeout 6
Dell(conf)#radius-server host 10.11.197.105 retransmit 4
Dell(conf)#interface gigabitethernet 2/23
Dell(conf-if-gi-2/23)#dot1x server-timeout 40
```

dot1x supplicant-timeout

Configure the amount of time after which exchanges with the supplicant time-out.

S6000

Syntax	`dot1x supplicant-timeout` *`seconds`* To return to the default, use the `no dot1x supplicant-timeout` command.
Parameters	seconds: Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.
Defaults	**30** seconds
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x tx-period

Configure the intervals at which EAPOL PDUs the Authenticator PAE transmits.

S6000

Syntax	`dot1x tx-period` *`seconds`* To return to the default, use the `no dot1x tx-period` command.
Parameters	**seconds** — Enter the interval time, in seconds, that EAPOL PDUs are transmitted. The range is from 1 to 65535. The default is **30**.
Defaults	**30** seconds
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

show dot1x cos-mapping interface

Display the CoS priority-mapping table the RADIUS server provides and applies to authenticated supplicants on an 802.1X-enabled system.

S6000

Syntax

```
show dot1x cos-mapping interface interface [mac-address mac-address]
```

Parameters

interface	Enter one of the following keywords and slot/port or number information:

- For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
- For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/port information.
- For a Ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

mac-address	(Optional) MAC address of an 802.1X-authenticated supplicant.

Defaults none

Command Modes

- EXEC
- EXEC privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.1	Introduced on the C-Series and S-Series.

Usage Information

Enter a supplicant's MAC address using the `mac-address` option to display CoS mapping information only for the specified supplicant.

You can display the CoS mapping information applied to traffic from authenticated supplicants on 802.1X-enabled ports that are in Single-Hot, Multi-Host, and Multi-Supplicant authentication modes.

Example

```
Dell#show dot1x cos-mapping interface tengigabitethernet 0/32

802.1p CoS re-map table on Te 0/32:
----------------------------------
Dot1p         Remapped Dot1p
0             7
1             6
2             5
3             4
4             3
5             2
6             1
7             0
Dell#
```

```
Dell#show dot1x cos-mapping interface tengigabitethernet 0/32
mac-address 00:00:00:00:00:10
Supplicant Mac: 0 0 0 0 0 10 Lookup for Mac:

802.1p CoS re-map table on Te 0/32:
----------------------------------

802.1p CoS re-map table for Supplicant: 00:00:00:00:00:10

Dot1p        Remapped Dot1p
0            7
1            6
2            5
3            4
4            3
5            2
6            1
7            0
Dell#
```

show dot1x interface

Display the 802.1X configuration of an interface.

S6000

Syntax	`show dot1x interface` *`interface`* `[mac-address` *`mac-address`*`]`
Parameters	

interface	Enter one of the following keywords and slot/port or number information: • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/port information. • For a Ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
mac-address	(Optional) MAC address of a supplicant.

Defaults

none

Command Modes

- EXEC
- EXEC privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.1	Added the `mac-address` option on the C-Series and S-Series.
Version 7.6.1.0	Introduced on the C-Series, E-Series, and S-Series.

Usage Information

If you enable 802.1X multi-supplicant authentication on a port, additional 802.1X configuration details (Port Authentication status, Untagged VLAN ID, Authentication PAE state, and Backend state) are displayed for each supplicant, as shown in the following example.

Example

```
Dell#show dot1x interface tengigabitethernet 0/32

802.1x information on Te 0/32:
-----------------------------
Dot1x Status:             Enable
Port Control:             AUTO
Port Auth Status:         AUTHORIZED(MAC-AUTH-BYPASS)
Re-Authentication:        Disable
Untagged VLAN id:         400
Guest VLAN:               Enable
Guest VLAN id:            100
Auth-Fail VLAN:           Disable
Auth-Fail VLAN id:        NONE
Auth-Fail Max-Attempts:   NONE
Mac-Auth-Bypass:          Enable
Mac-Auth-Bypass Only:     Enable
Tx Period:                3 seconds
Quiet Period:             60 seconds
ReAuth Max:               2
Supplicant Timeout:       30 seconds
Server Timeout:           30 seconds
Re-Auth Interval:         3600 seconds
Max-EAP-Req:              2
Host Mode:                SINGLE_HOST
Auth PAE State:           Authenticated
Backend State:            Idle
Dell#
```

Example (mac-address)

```
Dell#show dot1x interface tengigabitethernet 0/32 mac-address
00:00:00:00:00:10
Supplicant Mac: 0 0 0 0 0 10 Lookup for Mac:

802.1x information on Te 0/32:
-----------------------------
Dot1x Status:             Enable
Port Control:             AUTO
Re-Authentication:        Disable
Guest VLAN:               Enable
Guest VLAN id:            100
Auth-Fail VLAN:           Disable
Auth-Fail VLAN id:        NONE
Auth-Fail Max-Attempts:   NONE
Mac-Auth-Bypass:          Enable
Mac-Auth-Bypass Only:     Enable
Tx Period:                3 seconds
Quiet Period:             60 seconds
ReAuth Max:               2
Supplicant Timeout:       30 seconds
Server Timeout:           30 seconds
Re-Auth Interval:         3600 seconds
Max-EAP-Req:              2
Host Mode:                MULTI_AUTH
Max-Supplicants:          128

Port status and State info for Supplicant: 00:00:00:00:00:10

Port Auth Status:         AUTHORIZED(MAC-AUTH-BYPASS)
Untagged VLAN id:         400
Auth PAE State:           Authenticated
Backend State:            Idle
Dell#

Dell# show dot1x interface tengigabitethernet 0/32 mac-address
00:00:00:00:00:11
Supplicant Mac: 0 0 0 0 0 10 Lookup for Mac:

802.1x information on Te 0/32:
-----------------------------
Dot1x Status:             Enable
Port Control:             AUTO
Re-Authentication:        Disable
Guest VLAN:               Enable
Guest VLAN id:            100
Auth-Fail VLAN:           Disable
Auth-Fail VLAN id:        NONE
Auth-Fail Max-Attempts:   NONE
Mac-Auth-Bypass:          Enable
Mac-Auth-Bypass Only:     Enable
Tx Period:                3 seconds
Quiet Period:             60 seconds
ReAuth Max:               2
Supplicant Timeout:       30 seconds
Server Timeout:           30 seconds
Re-Auth Interval:         3600 seconds
Max-EAP-Req:              2
Host Mode:                MULTI_AUTH
Max-Supplicants:          128

Port status and State info for Supplicant: 00:00:00:00:00:11

Port Auth Status:         AUTHORIZED(GUEST-VLAN)
Untagged VLAN id:         100
Auth PAE State:           Authenticated
Backend State:            Idle
Dell#
```

6

Access Control Lists (ACL)

Access control lists (ACLs) are supported by the Dell Networking operating software on the S6000 platform.

Dell Networking OS supports the following types of ACL, IP prefix list, and route maps:

- Commands Common to all ACL Types
- Common IP ACL Commands
- Standard IP ACL Commands
- Extended IP ACL Commands
- Common MAC Access List Commands
- Standard MAC ACL Commands
- Extended MAC ACL Commands
- IP Prefix List Commands
- Route Map Commands
- AS-Path Commands
- IP Community List Commands

NOTE: For ACL commands that use the Trace function, refer to the Trace List Commands section in the Security chapter.

NOTE: For IPv6 ACL commands, refer to IPv6 Access Control Lists (IPv6 ACLs).

Commands Common to all ACL Types

The following commands are available within each ACL mode and do not have mode-specific options. Some commands in this chapter may use similar names, but require different options to support the different ACL types (for example, the `deny` and `permit` commands).

remark

Enter a description for an ACL entry.

S6000

Syntax	`remark [`*`remark-number`*`] [`*`description`*`]`
Parameters	*remark-number* — Enter the remark number. The range is from 0 to 4294967290. **NOTE:** You can use the same sequence number for the remark and an ACL rule.

description	Enter a description of up to 80 characters.

Defaults

Not configured.

Command Modes

- CONFIGURATION-STANDARD-ACCESS-LIST
- CONFIGURATION-EXTENDED-ACCESS-LIST
- CONFIGURATION-MAC ACCESS LIST-STANDARD
- CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.4.1.0	Introduced on the E-Series.

Usage Information

The `remark` command is available in each ACL mode. You can configure up to 4294967290 remarks in a given ACL.

The following example shows the use of the `remark` command twice within CONFIGURATION-STANDARD-ACCESS-LIST mode. The same sequence number was used for the remark and for an associated ACL rule. The remark precedes the rule in the running-config because it is assumed that the remark is for the rule with the same sequence number, or the group of rules that follow the remark.

Example

```
Dell(config-std-nacl)#remark 10 Deny rest of the traffic
Dell(config-std-nacl)#remark 5 Permit traffic from XYZ Inc.
Dell(config-std-nacl)#show config
!
ip access-list standard test
remark 5 Permit traffic from XYZ Inc.
seq 5 permit 1.1.1.0/24
remark 10 Deny rest of the traffic
seq 10 Deny any
Dell(config-std-nacl)#
```

Related Commands

show config — displays the current ACL configuration.

show config

Display the current ACL configuration.

S6000

Syntax	`show config`
Command Modes	CONFIGURATION-STANDARD-ACCESS-LIST CONFIGURATION-EXTENDED-ACCESS-LIST CONFIGURATION-MAC ACCESS LIST-STANDARD CONFIGURATION-MAC ACCESS LIST-EXTENDED
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell(config-std-nacl)#show conf
!
ip access-list standard test
 remark 5 Permit traffic from XYZ Inc.
 seq 5 permit 1.1.1.0/24 count
 remark 10 Deny traffic from ABC
 seq 10 deny 2.1.1.0/24 count
Dell(config-std-nacl)#
```

Common IP ACL Commands

The following commands are available within both IP ACL modes (Standard and Extended) and do not have mode-specific options. When an ACL is created without a rule and then is applied to an interface, ACL behavior reflects an implicit permit.

The supports both Ingress and Egress IP ACLs.

NOTE: Also refer to the Commands Common to all ACL Types section.

access-class

Apply a standard ACL to a terminal line.

S6000

Syntax	`access-class` *`access-list-name`* To remove an ACL, use the `no access-class` *`access-list-name`* command.
Parameters	*access-list-name*: Enter the name of a configured Standard ACL, up to 140 characters.
Defaults	Not configured.
Command Modes	LINE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increase the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

clear counters ip access-group

Erase all counters maintained for access lists.

S6000

Syntax `clear counters ip access-group [`*`access-list-name`*`]`

Parameters

access-list-name	(OPTIONAL) Enter the name of a configured access-list, up to 140 characters.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increase the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

ip access-group

Assign an IP access list (IP ACL) to an interface.

S6000

Syntax

```
ip access-group access-list-name {in | out} [implicit-permit]
[vlan vlan-id] [vrf vrf-name]
```

To delete an IP access-group configuration, use the `no ip access-group access-list-name {in | out} [implicit-permit] [vlan vlan-id] [vrf vrf-name]` command.

Parameters

access-list-name	Enter the name of a configured access list, up to 140 characters.
in	Enter the keyword `in` to apply the ACL to incoming traffic.
out	Enter the keyword `out` to apply the ACL to outgoing traffic.
implicit-permit	(OPTIONAL) Enter the keyword `implicit-permit` to change the default action of the ACL from implicit-deny to

	implicit-permit (that is, if the traffic does not match the filters in the ACL, the traffic is permitted instead of dropped).
vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the ID numbers of the VLANs. The range is from 1 to 4094 (you can use IDs from 1 to 4094).
vrf *vrf-name*	(OPTIONAL) Enter the keyword vrf then the ID numbers of the VRFs. The range is from 1 to 63 (you can use IDs from 1 to 63). NOTE: When you specify a single VRF, use the name of the VRF instead of the VRF ID number. Use the VRF ID numbers only when you specify a range of VRFs.

Defaults Not enabled.

Command Modes INTERFACE/VRF MODE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

You can assign one ACL (standard or extended ACL) to an interface.

NOTE: This command supports Loopback interfaces EE3 and EF series route processor modules (RPMs). This command does not support Loopback interfaces ED series RPMs, S-Series Loopback interfaces.

NOTE: If outbound(egress) IP acl is applied on switch port, filter will be applied only for routed traffic egressing out of that port.

Use the `vrf` attribute of this command to associate an access-list to a non-default VRF. You can use this command at the interface context (physical/LAG) to apply the access-list to a range of VRFs.

The VRF MODE is not available for the default and management VRFs.

Related Commands

ip access-list standard — configures a standard ACL.

ip access-list extended — configures an extended ACL.

ip control-plane egress-filter

Enable egress Layer 3 ACL lookup for IPv4 CPU traffic.

S6000

Syntax

```
ip control-plane egress-filter
```

Defaults

Not enabled.

Command Modes

EXEC Privilege

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

show ip accounting access-list

Display the IP access-lists created on the switch and the sequence of filters.

S6000

Syntax

```
show ip accounting {access-list access-list-name | cam_count}
interface interface [vrf vrf-name]
```

Parameters

access-list-name	Enter the name of the ACL to be displayed.
cam_count	List the count of the CAM rules for this ACL.
interface *interface*	Enter the keyword `interface` then the one of the following keywords and slot/port or number information: • For a Port Channel interface, enter the keyword `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

in | out	Identify whether ACL is applied on the ingress or egress side.
vrf *vrf-name*	(Optional) Enter the keyword vrf and then the name of the VRF to view the IP accounting information on either a default or a non-default VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for the 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced.

Usage Information

`show ip accounting access-lists` Field	Description
"Extended IP..."	Displays the name of the IP ACL.
"seq 5..."	Displays the filter. If the keywords `count` or `byte` were configured in the filter, the number of packets or bytes the filter processes is displayed at the end of the line.
"order 4"	Displays the QoS order of priority for the ACL entry.

Example

```
Dell#show ip accounting access-list
!
```

```
Standard Ingress IP access list test on TenGigabitEthernet 0/88
Total cam count 2
 seq 5 permit 1.1.1.0/24 count (0 packets)
 seq 10 deny 2.1.1.0/24 count (0 packets

Dell#show ip accounting access-list L3-ACL vrf vrf3
!
Standard Ingress IP access list L3-ACL on vrf3
Total cam count 3
seq 5 permit 10.1.2.0/24
 seq 10 permit 20.1.2.0/24
 seq 15 permit 30.1.2.0/24
Dell#
```

Standard IP ACL Commands

When you create an ACL without any rule and then apply it to an interface, the ACL behavior reflects an implicit permit.

The S6000 supports both Ingress and Egress IP ACLs.

NOTE: Also refer to the Commands Common to all ACL Types and Common IP ACL Commands sections.

deny

To drop packets with a certain IP address, configure a filter.

S6000

Syntax

`deny {`*`source`*` | any | host {`*`ip-address`*`}}`

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no deny {`*`source`*` [`*`mask`*`] | any | host `*`ip-address`*`}` command.

Parameters

source	Enter the IP address in dotted decimal format of the network from which the packet was sent.
any	Enter the keyword `any` to specify that all routes are subject to the filter. You can enter any of the following keywords to specify route types. • `bytes` — Enter the keyword `count` to count packets the filter processes. • `count` — Enter the keyword `bytesorder` to count bytes the filter processes. • `dscp` — Enter the keyword `dcsp` followed by the DCSP value to match to the IP DCSCP values. The range is from 0 to 63.

- `fragments` — Enter the keyword `fragments` to use ACLs to control packet fragments.
- `order` — Enter the keyword `order` to specify the QoS order of priority for the ACL entry. The range is from 0 to 254 (0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). The default is, if you do not use the keyword `order`, the ACLs have the lowest order by default (255).

host *ip-address*	Enter the keyword `host` and then enter the IP address to specify a host IP address only.

Defaults Not configured.

Command Modes CONFIGURATION-STANDARD-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Add the DSCP value for ACL matching.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
Version 6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the Quality of Service chapter of the *Dell Networking OS Configuration Guide*.

The software cannot count both packets and bytes, so when you enter the count byte options, only bytes are incremented.

Related Commands	ip access-list standard — configures a standard ACL. permit — configures a permit filter.

ip access-list standard

Create a standard IP access list (IP ACL) to filter based on IP address.

S6000

Syntax	`ip access-list standard access-list-name` To delete an access list, use the `no ip access-list standard access-list-name` command.

Parameters

access-list-name	Enter a string up to 140 characters long as the ACL name.

Defaults	All IP access lists contain an implicit “deny any,” that is, if no match occurs, the packet is dropped.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
Version 6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information	Dell Networking OS supports one ingress and one egress IP ACL per interface. Prior to Dell Networking OS version 7.8.1.0, names are up to 16 characters long. The number of entries allowed per ACL is hardware-dependent. For detailed specifications on entries allowed per ACL, refer to your line card documentation.

Example

```
Dell(conf)#ip access-list standard TestList
Dell(config-std-nacl)#
```

Related Commands	ip access-list extended — creates an extended access list. show config — displays the current configuration.

permit

To permit packets from a specific source IP address to leave the switch, configure a filter.

S6000

Syntax

`permit {source [mask]| any | host ip-address}`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit {source [mask] | any | host ip-address}` command.

Parameters

source	Enter the IP address in dotted decimal format of the network from which the packet was sent.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter. You can enter any of the following keywords to specify route types. • `bytes` — Enter the keyword `bytes` to count bytes processed by the filter. • `count` — Enter the keyword `count` to count packets the filter processes. • `dscp` — Enter the keyword `dcsp` to match to the IP DCSCP values. • `fragments` — Enter the keyword `fragments` to match to non-initial fragments of a datagram. • `order` — Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do

	not use the keyword `order`, the ACLs have the lowest order by default (255).
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address or hostname.

Defaults

Not configured.

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Add the DSCP value for ACL matching.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
Version 6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the “Quality of Service” chapter of the *Dell Networking OS Configuration Guide*.

Related Commands

deny — Assigns a IP ACL filter to deny IP packets.

ip access-list standard — creates a standard ACL.

resequence access-list

Re-assign sequence numbers to entries of an existing access-list.

S6000

Syntax

resequence access-list {ipv4 | ipv6 | mac} {*access-list-name StartingSeqNum Step-to-Increment*}

Parameters

ipv4 | ipv6 | mac	Enter the keyword `ipv4`or `mac` to identify the access list type to resequence.
access-list-name	Enter the name of a configured IP access list.
StartingSeqNum	Enter the starting sequence number to resequence. The range is from 0 to 4294967290.
Step-to-Increment	Enter the step to increment the sequence number. The range is from 1 to 4294967290.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the E-Series ExaScale (IPv6).
Version 8.1.1.0	Introduced on the E-Series ExaScale (IPv4).
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information	When you have exhausted all the sequence numbers, this feature permits re-assigning a new sequence number to entries of an existing access-list.

seq

Assign a sequence number to a deny or permit filter in an IP access list while creating the filter.

S6000

Syntax

```
seq sequence-number {deny | permit} {source [mask] | any | host
ip-address}} [count [bytes]] [dscp value] [order] [fragments]
```

To delete a filter, use the `no seq sequence-number` command.

Parameters

sequence-number	Enter a number from 0 to 4294967290.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this criteria.
source	Enter an IP address in dotted decimal format of the network from which the packet was received.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address or hostname.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
bytes	(OPTIONAL) Enter the keyword `bytes` to count bytes the filter processes.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DCSCP values.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS order for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults

Not configured

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Add the DSCP value for ACL matching.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
Version 6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. The following applies:

- The `seq` *`sequence-number`* command is applicable only in an ACL group.
- The `order` option works across ACL groups that have been applied on an interface via the QoS policy framework.
- The `order` option takes precedence over `seq` *`sequence-number`*.
- If *`sequence-number`* is not configured, the rules with the same order value are ordered according to their configuration order.
- If *`sequence-number`* is configured, the sequence-number is used as a tie breaker for rules with the same order.

Related Commands

deny — configures a filter to drop packets.

permit — configures a filter to forward packets.

Extended IP ACL Commands

When an ACL is created without any rule and then applied to an interface, ACL behavior reflects an implicit permit.

The following commands configure extended IP ACLs, which in addition to the IP address, also examine the packet's protocol type.

The supports both Ingress and Egress IP ACLs.

NOTE: Also refer to the Commands Common to all ACL Types and Common IP ACL Commands sections.

deny

Configure a filter that drops IP packets meeting the filter criteria.

S6000

Syntax

```
deny {ip | ip-protocol-number} {source mask | any | host ip-address} {destination mask | any | host ip-address} [count [byte] | log] [dscp value] [order] [monitor] [fragments]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no deny {ip |` *`ip-protocol-number`*`} {`*`source mask`*` | any | host `*`ip-address`*`} {`*`destination mask`*` | any | host `*`ip-address`*`}` command.

Parameters

ip	Enter the keyword `ip` to configure a generic IP access list. The keyword `ip` specifies that the access list denies all IP protocols.
ip-protocol-number	Enter a number from 0 to 255 to deny based on the protocol identified in the IP protocol header.
source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or noncontiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
count	(OPTIONAL) Enter the keyword `count` to count packets that the filter processes.

byte	(OPTIONAL) Enter the keyword `byte` to count bytes that the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to enter ACL matches in the log.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DCSCP values.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, refer to the "Flow-based Monitoring" section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Add the DSCP value for ACL matching.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for the noncontiguous mask and added the `monitor` option.

Version 6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the Quality of Service chapter of the *Dell Networking OS Configuration Guide*.

When you use the `log` option, the CP processor logs detail the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to the Port Monitoring chapter.

The C-Series and S-Series cannot count both packets and bytes, when you enter the count byte options, only bytes are incremented.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

deny tcp — assigns a filter to deny TCP packets.

deny udp — assigns a filter to deny UDP packets.

ip access-list extended — creates an extended ACL.

deny icmp

To drop all or specific internet control message protocol (ICMP) messages, configure a filter.

S6000

Syntax

```
deny icmp {source mask | any | host ip-address} {destination
mask | any | host ip-address} [dscp] [count [byte] | log]
[order] [monitor] [fragments]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny icmp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.

any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
dscp	Enter this keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to have the information kept in an ACL log file.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower order numbers have a higher priority) If you did not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, refer to the section "Flow-based Monitoring" in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults

Not configured.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.3.1.0	Added the keyword `dscp`.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.4.1.0	Added support for non-contiguous mask and added the `monitor` option.
Version 6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the Quality of Service chapter of the *Dell Networking OS Configuration Guide*.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to the Port Monitoring chapter.

When you use the `log` option, the CP processor logs details the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

deny tcp

Configure a filter that drops transmission control protocol (TCP) packets meeting the filter criteria.

S6000

Syntax

```
deny tcp {source mask | any | host ip-address} [bit] [operator
port [port]] {destination mask | any | host ip-address} [dscp]
[bit] [operator port [port]] [count [byte] | log] [order]
[monitor] [fragments]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no deny tcp {`*`source mask`*` | any | host `*`ip-address`*`} {`*`destination mask`*` | any | host `*`ip-address`*`}` command.

Parameters

source	Enter the IP address of the network or host from which the packets are sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.

dscp	Enter this keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.
bit	Enter a flag or combination of bits: • `ack`: acknowledgement field • `fin`: finish (no more data from the user) • `psh`: push function • `rst`: reset the connection • `syn`: synchronize sequence numbers • `urg`: urgent field
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the `port` command)
port port	Enter the application layer port number. Enter two port numbers if using the range logical operand. The range is from 0 to 65535. The following list includes some common TCP port numbers: • 23 = Telnet • 20 and 21 = FTP • 25 = SMTP • 169 = SNMP
destination	Enter the IP address of the network or host to which the packets are sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to have the information kept in an ACL log file. Supported on Jumbo-enabled line cards only.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where

	0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority) If you did not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, refer to the "Flow-based Monitoring" section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults

Not configured.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added the keyword `dscp`.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
Version 6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the Quality of Service chapter of the *Dell Networking OS Configuration Guide*.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to the Port Monitoring chapter.

When you use the `log` option, the CP processor logs details the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets’ details.

The C-Series and S-Series cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt, or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
Rule#  Data             Mask         From To #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example

An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
Rule# Data             Mask         From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024

Total Ports: 1024
```

Related Commands

deny — assigns a filter to deny IP traffic.

deny udp — assigns a filter to deny UDP traffic.

deny udp

To drop user datagram protocol (UDP) packets meeting the filter criteria, configure a filter.

S6000

Syntax

```
deny udp {source mask | any | host ip-address} [operator port
[port]] {destination mask | any | host ip-address} [dscp]
[operator port [port]] [count [byte] | log] [order] [monitor]
[fragments]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny udp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
dscp	Enter this keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the `port` command)
port port	Enter the application layer port number. Enter two port numbers if using the range logical operand. The range is from 0 to 65535.
destination	Enter the IP address of the network or host to which the packets are sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to have the information kept in an ACL log file. Supported on Jumbo-enabled line cards only.

order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority) If you did not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, refer to the section “Flow-based Monitoring” in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults

Not configured.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added the keyword `dscp`.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
Version 6.5.1.0	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the Quality of Service chapter of the *Dell Networking OS Configuration Guide*.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to the Port Monitoring chapter.

When you use the `log` option, the CP processor logs details the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

The C-Series and S-Series cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
Rule#  Data                Mask            From To #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example

An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
Rule# Data                 Mask            From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024

Total Ports: 1024
```

Related Commands

deny — assigns a filter to deny IP traffic.

deny tcp — assigns a filter to deny TCP traffic.

ip access-list extended

Name (or select) an extended IP access list (IP ACL) based on IP addresses or protocols.

S6000

Syntax `ip access-list extended *access-list-name*`

To delete an access list, use the `no ip access-list extended *access-list-name*` command.

Parameters

access-list-name	Enter a string up to 140 characters long as the access list name.

Defaults All access lists contain an implicit "deny any"; that is, if no match occurs, the packet is dropped.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information The number of entries allowed per ACL is hardware-dependent. For detailed specification on entries allowed per ACL, refer to your line card documentation.

Prior to 7.8.1.0, names are up to 16 characters long.

Example

```
Dell(conf)#ip access-list extended TESTListEXTEND
Dell(config-ext-nacl)#
```

Related Commands

ip access-list standard — configures a standard IP access list.

show config — displays the current configuration.

permit

To pass IP packets meeting the filter criteria, configure a filter.

S6000

Syntax

`permit {source mask | any | host ip-address} {destination mask | any | host ip-address} [count [bytes]] [dscp value] [order] [fragments]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

source	Enter the IP address in dotted decimal format of the network from which the packet was sent.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address or hostname.
destination	Enter the IP address of the network or host to which the packets are sent.
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
bytes	(OPTIONAL) Enter the keyword `bytes` to count bytes processed by the filter.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DCSCP values.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults

Not configured.

Command Modes	CONFIGURATION-EXTENDED-ACCESS-LIST
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Add the DSCP value for ACL matching.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option.
Version 6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information	The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the “Quality of Service” chapter of the *Dell Networking OS Configuration Guide*. The software cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.
Related Commands	ip access-list extended — creates an extended ACL. permit tcp — assigns a permit filter for TCP packets. permit udp — assigns a permit filter for UDP packets.

permit tcp

To pass TCP packets meeting the filter criteria, configure a filter.

S6000

Syntax

```
permit tcp {source mask | any | host ip-address} [bit]
[operator port [port]] {destination mask | any | host ip-
address} [bit] [dscp] [operator port [port]] [count [byte] |
log] [order] [monitor] [fragments]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no permit tcp {`*`source mask`*` | any | host `*`ip-address`*`} {`*`destination mask`*` | any | host `*`ip-address`*`}` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
bit	Enter a flag or combination of bits: • `ack`: acknowledgement field • `fin`: finish (no more data from the user) • `psh`: push function • `rst`: reset the connection • `syn`: synchronize sequence numbers • `urg`: urgent field
dscp	Enter the keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the port parameter)
port port	Enter the application layer port number. Enter two port numbers if you are using the range logical operand. The range is from 0 to 65535. The following list includes some common TCP port numbers: • 23 = Telnet

- 20 and 21 = FTP
- 25 = SMTP
- 169 = SNMP

destination	Enter the IP address of the network or host to which the packets are sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to have the information kept in an ACL log file.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, refer to the Flow-based Monitoring section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults	Not configured.
Command Modes	CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added the keyword `dscp`.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
Version 6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the "Quality of Service" chapter of the *Dell Networking OS Configuration Guide*.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

The S-Series cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to Port Monitoring.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt, or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
Rule# Data              Mask            From To   #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example

An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
Rule# Data             Mask             From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024

Total Ports: 1024
```

Related Commands

ip access-list extended — creates an extended ACL.

permit — assigns a permit filter for IP packets.

permit udp — assigns a permit filter for UDP packets.

permit udp

To pass UDP packets meeting the filter criteria, configure a filter.

Syntax

`permit udp {source mask | any | host ip-address} [operator port [port]] {destination mask | any | host ip-address} [dscp] [operator port [port]] [count [byte] | log] [order] [monitor] [fragments]`

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no permit udp {source mask | any | host ip-address} {destination mask | any | host ip-address` command.

Parameters

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` and then enter the IP address to specify a host IP address.
dscp	Enter the keyword `dscp` to deny a packet based on the DSCP value. The range is from 0 to 63.
operator	(OPTIONAL) Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than

- `lt` = less than
- `range` = inclusive range of ports (you must specify two ports for the `port` parameter)

port port	Enter the application layer port number. Enter two port numbers if you are using the `range` logical operand. The range is 0 to 65535.
destination	Enter the IP address of the network or host to which the packets are sent.
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to have the information kept in an ACL log file.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS priority for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, refer to the Flow-based Monitoring section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.
fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults Not configured.

Command Modes CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.3.1.0	Added the keyword `dscp`.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for non-contiguous mask and added the `monitor` option. .
Version 6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `order` option is relevant in the context of the Policy QoS feature only. For more information, refer to the “Quality of Service” chapter of the *Dell Networking OS Configuration Guide*.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets’ details.

The S-Series cannot count both packets and bytes; when you enter the count byte options, only bytes are incremented.

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to Port Monitoring.

Most ACL rules require one entry in the CAM. However, rules with TCP and UDP port operators (for example, gt, lt, or range) may require more than one entry. The range of ports is configured in the CAM based on bit mask boundaries; the space required depends on exactly what ports are included in the range.

Example

An ACL rule with a TCP port range of 4000–8000 uses eight entries in the CAM.

```
Rule#  Data                 Mask          From  To    #Covered

1 0000111110100000 1111111111100000 4000 4031 32
2 0000111111000000 1111111111000000 4032 4095 64
3 0001000000000000 1111100000000000 4096 6143 2048
4 0001100000000000 1111110000000000 6144 7167 1024
5 0001110000000000 1111111000000000 7168 7679 512
6 0001111000000000 1111111100000000 7680 7935 256
7 0001111100000000 1111111111000000 7936 7999 64
8 0001111101000000 1111111111111111 8000 8000 1

Total Ports: 4001
```

Example	An ACL rule with a TCP port lt 1023 uses only one entry in the CAM.

```
Rule# Data             Mask             From To   #Covered

1 0000000000000000 1111110000000000 0    1023 1024

Total Ports: 1024
```

Related Commands

[ip access-list extended](#) — creates an extended ACL.

[permit](#) — assigns a permit filter for IP packets.

[permit tcp](#) — assigns a permit filter for TCP packets.

resequence access-list

Re-assign sequence numbers to entries of an existing access-list.

S6000

Syntax

```
resequence access-list {ipv4 | mac} {access-list-name
StartingSeqNum Step-to-Increment}
```

Parameters

ipv4 | mac	Enter the keyword `ipv4`or `mac` to identify the access list type to resequence.
access-list-name	Enter the name of a configured IP access list, up to 140 characters.
StartingSeqNum	Enter the starting sequence number to resequence. The range is from 0 to 4294967290.
Step-to-Increment	Enter the step to increment the sequence number. The range is from 1 to 4294967290.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale (IPv4).
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

When all sequence numbers have been exhausted, this feature permits re-assigning a new sequence number to entries of an existing access-list.

seq

Assign a sequence number to a deny or permit filter in an extended IP access list while creating the filter.

S6000

Syntax

```
seq sequence-number {deny | permit} {ip-protocol-number | icmp
| ip | tcp | udp} {source mask | any | host ip-address}
{destination mask | any | host ip-address} [operator port
[port]] [count [byte] | log] [dscp value] [order] [monitor]
[fragments]
```

Parameters

sequence-number	Enter a number from 0 to 4294967290. For the , the range is from 0 to 65534.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this criteria.
ip-protocol-number	Enter a number from 0 to 255 to filter based on the protocol identified in the IP protocol header.
icmp	Enter the keyword `icmp` to configure an ICMP access list filter.
ip	Enter the keyword `ip` to configure a generic IP access list. The keyword `ip` specifies that the access list permits all IP protocols.
tcp	Enter the keyword `tcp` to configure a TCP access list filter.
udp	Enter the keyword `udp` to configure a UDP access list filter.
source	Enter an IP address in dotted decimal format of the network from which the packet was received.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D. The mask, when specified in A.B.C.D format, may be either contiguous or non-contiguous.
any	Enter the keyword `any` to specify that all routes are subject to the filter.
host *ip-address*	Enter the keyword `host` and then enter the IP address to specify a host IP address or hostname.

operator	(OPTIONAL) Enter one of the following logical operands: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the `port` parameter.)
port port	(OPTIONAL) Enter the application layer port number. Enter two port numbers if you are using the range logical operand. The range is from 0 to 65535. The following list includes some common TCP port numbers: • 23 = Telnet • 20 and 21 = FTP • 25 = SMTP • 169 = SNMP
destination	Enter the IP address of the network or host to which the packets are sent.
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to enter ACL matches in the log. Supported on Jumbo-enabled line cards only.
dscp	(OPTIONAL) Enter the keyword `dcsp` to match to the IP DCSCP values.
order	(OPTIONAL) Enter the keyword `order` to specify the QoS order for the ACL entry. The range is from 0 to 254 (where 0 is the highest priority and 254 is the lowest; lower-order numbers have a higher priority). If you do not use the keyword `order`, the ACLs have the lowest order by default (255).
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. NOTE: For more information, refer to the Flow-based Monitoring section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.

fragments	Enter the keyword `fragments` to use ACLs to control packet fragments.

Defaults	Not configured
Command Modes	CONFIGURATION-EXTENDED-ACCESS-LIST
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Add the DSCP value for ACL matching.
Version 8.2.1.0	Allows ACL control of fragmented packets for IP (Layer 3) ACLs.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added support for the non-contiguous mask and added the `monitor` option. Deprecated the keyword `established`.
Version 6.5.10	Expanded to include the optional QoS `order` priority for the ACL entry.

Usage Information

The `monitor` option is relevant in the context of flow-based monitoring only. For more information, refer to Port Monitoring.

The `order` option is relevant in the context of the Policy QoS feature only. The following applies:

- The `seq` *`sequence-number`* command is applicable only in an ACL group.
- The `order` option works across ACL groups that have been applied on an interface via the QoS policy framework.
- The `order` option takes precedence over `seq` *`sequence-number`*.
- If *`sequence-number`* is not configured, the rules with the same order value are ordered according to their configuration order.
- If *`sequence-number`* is configured, the sequence-number is used as a tie breaker for rules with the same order.

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

If you configure the *`sequence-number`*, the *`sequence-number`* is used as a tie breaker for rules with the same order.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands	deny — configures a filter to drop packets. permit — configures a filter to forward packets.

Common MAC Access List Commands

The following commands are available within both MAC ACL modes (Standard and Extended) and do not have mode-specific options. These commands allow you to clear, display, and assign MAC ACL configurations.

The S6000 supports both Ingress and Egress MAC ACLs.

The MAC ACL can be applied on Physical, Port-channel and VLAN interfaces. As per the specified rules in the acl, the traffic on the interface/ VLAN members or Port-channel members will be permitted or denied.

clear counters mac access-group

Clear counters for all or a specific MAC ACL.

S6000

Syntax

```
clear counters mac access-group [mac-list-name]
```

Parameters

mac-list-name	(OPTIONAL) Enter the name of a configured MAC access list.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

mac access-group

Apply a MAC ACL to traffic entering or exiting an interface. The following interface types can be used for VLAN , Physical interface, Port channel interface. Enter into the interface mode and apply the mac acl in the following manner.

S6000

Syntax

Applying MAC Access group on a physical / port channel interface`mac access-group access-list-name {in [vlan vlan-range] | out}`

To delete a MAC access-group, use the `no mac access-group mac-list-name` command.

Parameters

access-list-name	Enter the name of a configured MAC access list, up to 140 characters.
vlan *vlan-range*	(OPTIONAL) Enter the keyword `vlan` and then enter a range of VLANs. The range is from 1 to 4094 (you can use IDs 1 to 4094). **NOTE:** This option is available only with the keyword`in` option.
in	Enter the keyword `in` to configure the ACL to filter incoming traffic.
out	Enter the keyword `out` to configure the ACL to filter outgoing traffic. **NOTE:** The option is not available on the S-Series.

NOTE:

1. If the MAC ACL is applied on VLAN, none of the VLAN members should have an access list applied for that VLAN.

2. If the MAC ACL is applied on a Physical or Port Channel interface, the VLAN in which this port is associated should not have an access list applied.

3. If the MAC ACL is applied on a VLAN, then that VLAN should not belong to VLAN ACL group.

4. If the MAC ACL is applied on a VLAN ACL group, then none of the VLANs in that group should have an access list applied on it.

Defaults	none
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

You can assign one ACL (standard or extended) to an interface.

Related Commands

mac access-list standard — configures a standard MAC ACL.

mac access-list extended — configures an extended MAC ACL.

show mac access-lists

Display all of the Layer 2 ACLs configured in the system, whether or not they are applied to an interface, and the count of matches/mismatches against each ACL entry displayed.

S6000

Syntax

```
show mac access-lists [access-list-name] [interface interface]
[in | out]
```

Parameters

access-list-name	Enter the name of a configured MAC ACL, up to 140 characters.
interface *interface*	Enter the keyword `interface` then the one of the following keywords and slot/port or number information: • For a Port Channel interface, enter the keyword `port-channel` and then enter a number. The C-Series and S-Series range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` and then enter the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` and then enter the slot/port information. • For a VLAN interface, enter the keyword `VLAN` followed by the vlan id.
in | out	Identify whether ACL is applied on ingress or egress side.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.4.1.0	Introduced.

show mac accounting access-list

Display MAC access list configurations and counters (if configured).

S6000

Syntax	`show mac accounting access-list access-list-name interface interface in | out`
Parameters	

access-list-name	Enter the name of a configured MAC ACL, up to 140 characters.
interface *interface*	Enter the keyword `interface` then the one of the following keywords and slot/port or number information: • For a Port Channel interface, enter the keyword `port-channel` and then enter a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` and then enter the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` and then enter the slot/port information. • For a VLAN interface, enter the keyword `VLAN` followed by the vlan id.
in | out	Identify whether ACL is applied on ingress or egress side.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The ACL hit counters in this command increment the counters for each matching rule, not just the first matching rule.

Example

```
Dell#show mac accounting access-list TestMac interface
tengigabitethernet 0/89 in
Ingress Standard mac access-list TestMac on TenGigabitEthernet
0/89
Total cam count 2
 seq 5 permit aa:aa:aa:aa:00:00 00:00:00:00:ff:ff count (0
packets)
 seq 10 deny any count (20072594 packets)
Dell#
```

Standard MAC ACL Commands

When you create an access control list without any rule and then apply it to an interface, the ACL behavior reflects implicit permit. These commands configure standard MAC ACLs.

The S6000 support both Ingress and Egress MAC ACLs.

NOTE: For more information, also refer to the Commands Common to all ACL Types and Common MAC Access List Commands sections.

deny

To drop packets with a the MAC address specified, configure a filter.

S6000

Syntax

`deny {any | mac-source-address [mac-source-address-mask]} [count [byte]] [log] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | mac-source-address mac-source-address-mask}` command.

Parameters

any	Enter the keyword `any` to specify that all routes are subject to the filter.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.

mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. If no mask is specified, a mask of 00:00:00:00:00:00 is applied (in other words, the filter allows only MAC addresses that match).
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to log the packets.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, refer to the "Flow-based Monitoring" section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.

Defaults

Not enabled.

Command Modes

CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added the `monitor` option.

Usage Information

When you use the `log` option, the CP processor logs detail the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands	permit — configures a MAC address filter to pass packets. seq — configures a MAC address filter with a specified sequence number.

mac access-list standard

To configure a standard MAC ACL, name a new or existing MAC access control list (MAC ACL) and enter MAC ACCESS LIST mode. Also refer to the Commands Common to all ACL Types section and the Common MAC Access List Commands section.

S6000

Syntax

```
mac access-list standard mac-list-name
```

To delete a MAC access list, use the `no mac access-list standard mac-list-name` command.

Parameters

mac-list-name	Enter a text string as the name of the standard MAC access list (140 character maximum).

Defaults	Not configured.
Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information	Dell Networking OS supports one ingress and one egress MAC ACL per interface.

The number of entries allowed per ACL is hardware-dependent. For detailed specifications on entries allowed per ACL, refer to your line card documentation.

NOTE: Ingress ACLs are supported on C-Series and S-Series platforms only.

Example

```
Dell(conf)#mac-access-list access-list standard TestMAC
Dell(config-std-macl)#permit 00:00:00:00:00:00
00:00:00:00:ff:ff count
Dell(config-std-macl)#deny  any count
```

permit

To forward packets from a specific source MAC address, configure a filter.

S6000

Syntax

`permit {any | mac-source-address [mac-source-address-mask]} [count [byte]] | [log] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit {any | mac-source-address mac-source-address-mask}` command.

Parameters

any	Enter the keyword `any` to forward all packets received with a MAC address.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. If no mask is specified, a mask of 00:00:00:00:00:00 is applied (in other words, the filter allows only MAC addresses that match).
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to log the packets.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, refer to the Flow-based Monitoring section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.

Defaults

Not configured.

Command Modes

CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

deny — configures a MAC ACL filter to drop packets.

seq —configure a MAC ACL filter with a specified sequence number.

seq

To a deny or permit filter in a MAC access list while creating the filter, assign a sequence number.

S6000

Syntax

```
seq sequence-number {deny | permit} {any | mac-source-address
[mac-source-address-mask]} [count [byte]] [log] [monitor]
```

To remove this filter, use the `no seq sequence-number` command.

Parameters

sequence-number	Enter a number from 0 to 65535.

deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this criteria.
any	Enter the keyword `any` to filter all packets.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. If no mask is specified, a mask of 00:00:00:00:00:00 is applied (in other words, the filter allows only MAC addresses that match).
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to log the packets.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. NOTE: For more information, refer to the “Flow-based Monitoring” section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.

Defaults Not configured

Command Modes CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added the `monitor` option.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

deny — configures a filter to drop packets.

permit — configures a filter to forward packets.

Extended MAC ACL Commands

When an access-list is created without any rule and then applied to an interface, ACL behavior reflects implicit permit. The following commands configure Extended MAC ACLs.

The S6000 supports both Ingress and Egress MAC ACLs.

NOTE: For more information, also refer to the Commands Common to all ACL Types and Common MAC Access List Commands sections.

deny

To drop packets that match the filter criteria, configure a filter.

S6000

Syntax

```
deny {any | host mac-address | mac-source-address mac-source-address-mask} {any | host mac-address | mac-destination-address mac-destination-address-mask} [ethertype-operator] [count [byte]] [log] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no deny {any | host` *`mac-address`* `|` *`mac-source-address mac-source-address-mask`*`} {any |` *`host mac-address`* `|` *`mac-destination-address mac-destination-address-mask`*`}` command.

Parameters

any	Enter the keyword `any` to drop all packets.
host *mac-address*	Enter the keyword `host` and then enter a MAC address to drop packets with that host address.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	Specify which bits in the MAC address must match. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.
mac-destination-address	Enter the destination MAC address and mask in nn:nn:nn:nn:nn:nn format.
mac-destination-address-mask	Specify which bits in the MAC address must match. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.
ethertype operator	(OPTIONAL) To filter based on protocol type, enter one of the following Ethertypes: • `ev2` - is the Ethernet II frame format • `llc` - is the IEEE 802.3 frame format • `snap` - is the IEEE 802.3 SNAP frame format
count	(OPTIONAL) Enter the keyword `count` to count packets processed by the filter.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes processed by the filter.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to log the packets.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. For more information, refer to the “Flow-based Monitoring” section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.

Defaults Not configured.

Command Modes CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added the `monitor` option.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When you use the `log` option, the CP processor logs detail the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

permit — configures a MAC address filter to pass packets.

seq — configures a MAC address filter with a specified sequence number.

mac access-list extended

Name a new or existing extended MAC access control list (extended MAC ACL).

S6000

Syntax

```
mac access-list extended access-list-name [cpu-qos
```

To delete a MAC access list, use the `no mac access-list extended access-list-name` command.

Parameters

access-list-name	Enter a text string as the MAC access list name, up to 140 characters.
cpu-qos	Enter the keywords `cpu-qos` to assign this ACL to control plane traffic only (CoPP).

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The number of entries allowed per ACL is hardware-dependent. For detailed specifications on entries allowed per ACL, refer to your line card documentation.

Prior to 7.8.1.0, names are up to 16 characters long.

Example

```
Dell(conf)#mac-access-list access-list extended TestMATExt
Dell(config-ext-macl)#remark 5 IPv4
Dell(config-ext-macl)#seq 10 permit any any ev2 eq 800 count
bytes
Dell(config-ext-macl)#remark 15 ARP
Dell(config-ext-macl)#seq 20 permit any any ev2 eq 806 count
bytes
Dell(config-ext-macl)#remark 25 IPv6
Dell(config-ext-macl)#seq 30 permit any any ev2 eq 86dd count
bytes
Dell(config-ext-macl)#seq 40 permit any any count bytes
Dell(config-ext-macl)#exit
Dell(conf)#do show mac accounting access-list snickers
interface g0/47 in
Extended mac access-list snickers on GigabitEthernet 0/47
seq 10 permit any any ev2 eq 800 count bytes (559851886
packets 191402152148
bytes)
seq 20 permit any any ev2 eq 806 count bytes (74481486 packets
5031686754
bytes)
```

```
seq 30 permit any any ev2 eq 86dd count bytes (7751519 packets
797843521 bytes)
```

Related Commands

[mac access-list standard](#) — configures a standard MAC access list.

[show mac accounting access-list](#) — displays MAC access list configurations and counters (if configured).

permit

To pass packets matching the criteria specified, configure a filter.

S6000

Syntax

`permit {any | host mac-address | mac-source-address mac-source-address-mask} {any | host mac-address | mac-destination-address mac-destination-address-mask} [ethertype operator] [count [byte]] | [log] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no permit {any | host` *`mac-address`* `|` *`mac-source-address mac-source-address-mask`*`} {any |` *`mac-destination-address mac-destination-address-mask`*`}` command.

Parameters

any	Enter the keyword `any` to forward all packets.
host	Enter the keyword `host` then a MAC address to forward packets with that host address.
mac-source-address	Enter a MAC address in nn:nn:nn:nn:nn:nn format.
mac-source-address-mask	(OPTIONAL) Specify which bits in the MAC address must match. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.
mac-destination-address	Enter the destination MAC address and mask in nn:nn:nn:nn:nn:nn format.
mac-destination-address-mask	Specify which bits in the MAC address must be matched. The MAC ACL supports an inverse mask; therefore, a mask of ff:ff:ff:ff:ff:ff allows entries that do not match and a mask of 00:00:00:00:00:00 only allows entries that match exactly.

ethertype operator	(OPTIONAL) To filter based on protocol type, enter one of the following Ethertypes: • `ev2` - is the Ethernet II frame format • `llc` - is the IEEE 802.3 frame format • `snap` - is the IEEE 802.3 SNAP frame format
count	(OPTIONAL) Enter the keyword `count` to count packets the filter processes.
byte	(OPTIONAL) Enter the keyword `byte` to count bytes the filter processes.
log	(OPTIONAL, E-Series only) Enter the keyword `log` to log the packets.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface. **NOTE:** For more information, refer to the Flow-based Monitoring section in the Port Monitoring chapter of the *Dell Networking OS Configuration Guide*.

Defaults Not configured.

Command Modes CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added the `monitor` option.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When you use the `log` option, the CP processor logs details about the packets that match. Depending on how many packets match the log entry and at what rate, the CP may become busy as it has to log these packets' details.

> NOTE: When ACL logging and byte counters are configured simultaneously, byte counters may display an incorrect value. Configure packet counters with logging instead.

Related Commands

deny — configures a MAC ACL filter to drop packets.

seq — configure a MAC ACL filter with a specified sequence number.

IP Prefix List Commands

When you create an access-list without any rule and then apply it to an interface, the ACL behavior reflects implicit permit.

To configure or enable IP prefix lists, use these commands.

clear ip prefix-list

Reset the number of times traffic mets the conditions ("hit" counters) of the configured prefix lists.

S6000

Syntax

```
clear ip prefix-list [prefix-name]
```

Parameters

prefix-name	(OPTIONAL) Enter the name of the configured prefix list to clear only counters for that prefix list, up to 140 characters long.

Defaults

Clears "hit" counters for all prefix lists unless a prefix list is specified.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increase the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

ip prefix-list — configures a prefix list.

deny

To drop packets meeting the criteria specified, configure a filter.

S6000

Syntax

`deny ip-prefix [ge min-prefix-length] [le max-prefix-length]`

To delete a drop filter, use the `no deny ip-prefix` command.

Parameters

ip-prefix	Specify an IP prefix in the network/length format. For example, 35.0.0.0/ 8 means match the first 8 bits of address 35.0.0.0.
ge *min-prefix-length*	(OPTIONAL) Enter the keyword `ge` and then enter the minimum prefix length, which is a number from zero (0) to 32.
le *max-prefix-length*	(OPTIONAL) Enter the keyword `le` and then enter the maximum prefix length, which is a number from zero (0) to 32.

Defaults

Not configured.

Command Modes

PREFIX-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Sequence numbers for this filter are automatically assigned starting at sequence number 5.

If you do not use the `ge` or `le` options, only packets with an exact match to the prefix are filtered.

ip prefix-list

Enter the PREFIX-LIST mode and configure a prefix list.

S6000

Syntax

`ip prefix-list` *`prefix-name`*

To delete a prefix list, use the `no ip prefix-list` *`prefix-name`* command.

Parameters

prefix-name	Enter a string up to 16 characters long as the name of the prefix list, up to 140 characters long.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Prefix lists redistribute OSPF and RIP routes meeting specific criteria.

Related Commands

show ip route list — displays IP routes in an IP prefix list.

show ip prefix-list summary — displays a summary of the configured prefix lists.

seq

To a deny or permit filter in a prefix list while configuring the filter, assign a sequence number.

S6000

Syntax

`seq sequence-number {deny | permit} {any} | [ip-prefix /nn {ge min-prefix-length} {le max-prefix-length}] | [bitmask number]`

To delete a specific filter, use the `no seq sequence-number {deny | permit} {any} | [ip-prefix {ge min-prefix-length} {le max-prefix-length}] | [bitmask number]`.

Parameters

sequence-number	Enter a number. The range is from 1 to 4294967294.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition..
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this condition.
any	(OPTIONAL) Enter the keyword `any` to match any packets.
ip-prefix /nn	(OPTIONAL) Specify an IP prefix in the network/length format. For example, 35.0.0.0/8 means match the first 8 bits of address 35.0.0.0.
ge *min-prefix-length*	(OPTIONAL) Enter the keyword `ge` and then enter the minimum prefix length, which is a number from zero (0) to 32.
le *max-prefix-length*	(OPTIONAL) Enter the keyword `le` and then enter the maximum prefix length, which is a number from zero (0) to 32.
bitmask *number*	Enter the keyword `bitmask` then enter a bit mask number in dotted decimal format.

Defaults

Not configured.

Command Modes

PREFIX-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Added the `bit mask` option.

Usage Information

If you do not use the `ge` or `le` options, only packets with an exact match to the prefix are filtered.

show config

Display the current PREFIX-LIST configurations.

S6000

Syntax

```
show config
```

Command Modes

PREFIX-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell(conf-nprefixl)#show config
!
ip prefix-list snickers
Dell(conf-nprefixl)#
```

show ip prefix-list detail

Display details of the configured prefix lists.

S6000

Syntax `show ip prefix-list detail [prefix-name]`

Parameters

prefix-name	(OPTIONAL) Enter a text string as the name of the prefix list, up to 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show ip prefix-list detail
Ip Prefix-list with the last deletion/insertion: PL_OSPF_to_RIP
ip prefix-list PL_OSPF_to_RIP:
count: 3, range entries: 1, sequences: 5 - 25
   seq 5 permit 1.1.1.0/24 (hit count: 0)
seq 10 deny 2.1.0.0/16 ge 23 (hit count: 0)
seq 25 permit 192.0.0.0 bitmask 192.0.0.0 (hit count: 800)
```

show ip prefix-list summary

Display a summary of the configured prefix lists.

S6000

Syntax `show ip prefix-list summary [`*`prefix-name`*`]`

Parameters

prefix-name	(OPTIONAL) Enter a text string as the name of the prefix list, up to 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show ip prefix-list summary
Ip Prefix-list with the last deletion/insertion: PL_OSPF_to_RIP
ip prefix-list PL_OSPF_to_RIP:
count: 3, range entries: 1, sequences: 5 - 25
```

Route Map Commands

When you create an access-list without any rule and then applied to an interface, the ACL behavior reflects implicit permit.

To configure route maps and their redistribution criteria, use the following commands.

continue

To a route-map entry with a higher sequence number, configure a route-map.

S6000

Syntax

`continue [sequence-number]`

Parameters

sequence-number	(OPTIONAL) Enter the route map sequence number. The range is from 1 to 65535.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

The `continue` feature allows movement from one route-map entry to a specific route-map entry (the sequence number). If you do not specify the sequence number, the `continue` feature simply moves to the next sequence number (also known as an implied continue). If a match clause exists, the `continue` feature executes only after a successful match occurs. If there are no successful matches, the `continue` feature is ignored.

Match clause with Continue clause

The `continue` feature can exist without a match clause. A continue clause without a match clause executes and jumps to the specified route-map entry.

With a match clause and a continue clause, the match clause executes first and the continue clause next in a specified route map entry. The continue clause launches only after a successful match. The behavior is:

- A successful match with a continue clause, the route map executes the set clauses and then goes to the specified route map entry upon execution of the continue clause.
- If the next route map entry contains a continue clause, the route map executes the continue clause if a successful match occurs.
- If the next route map entry does not contain a continue clause, the route map evaluates normally. If a match does not occur, the route map does not continue and falls through to the next sequence number, if one exists.

Set Clause with Continue Clause

If the route-map entry contains sets with the continue clause, set actions are performed first then the continue clause jumps to the specified route map entry.

- If a set action occurs in the first route map entry and then the same set action occurs with a different value in a subsequent route map entry, the last set of actions overrides the previous set of actions with the same `set` command.
- If `set community additive` and `set as-path prepend` are configure, the communities and AS numbers are prepended.

Related Commands

set community — specifies a COMMUNITY attribute.

set as-path — configures a filter to modify the AS path.

description

Add a description to this route map.

S6000

Syntax

`description {`*`description`*`}`

To remove the description, use the `no description {`*`description`*`}` command.

Parameters

description	Enter a description to identify the route map (80 characters maximum).

Defaults

none

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
pre-Version 7.7.1.0	Introduced.

Related Commands: route-map — enables a route map.

match as-path

To match routes that have a certain AS number in their BGP path, configure a filter.

S6000

Syntax

```
match as-path as-path-name
```

To delete a match AS path filter, use the `no match as-path as-path-name` command.

Parameters

as-path-name	Enter the name of an established AS-PATH ACL, up to 140 characters.

Defaults: Not configured.

Command Modes: ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands set as-path — adds information to the BGP AS_PATH attribute.

match community

To match routes that have a certain COMMUNITY attribute in their BGP path, configure a filter.

S6000

Syntax

```
match community community-list-name [exact]
```

To delete a community match filter, use the `no match community` command.

Parameters

community-list-name	Enter the name of a configured community list.
exact	(OPTIONAL) Enter the keywords `exact` to process only those routes with this community list name.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands set community — specifies a COMMUNITY attribute.

match interface

To match routes whose next hop is on the interface specified, configure a filter.

S6000

Syntax

`match interface interface`

To remove a match, use the `no match interface interface` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • . • For the loopback interface, enter the keyword `loopback` then a number from zero (0) to 16383. • For a Port Channel interface, enter the keyword `port-channel` then a number. The range is from 1 to 128. • For a SONET interface, enter the keyword `sonet` then the slot/port information. • For a Ten Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094 (you can use IDs 1 to 4094).

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

match ip address — redistributes routes that match an IP address.

match ip next-hop — redistributes routes that match the next-hop IP address.

match ip route-source — redistributes routes that match routes advertised by other routers.

match metric — redistributes routes that match a specific metric.

match route-type — redistributes routes that match a route type.

match tag — redistributes routes that match a specific tag.

match ip address

To match routes based on IP addresses specified in an access list, configure a filter.

S6000

Syntax

```
match ip address prefix-list-name
```

To delete a match, use the `no match ip address` *`prefix-list-name`* command.

Parameters

prefix-list-name	Enter the name of configured prefix list, up to 140 characters.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
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Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

match interface — redistributes routes that match the next-hop interface.

match ip next-hop — redistributes routes that match the next-hop IP address.

match ip route-source — redistributes routes that match routes advertised by other routers.

match metric — redistributes routes that match a specific metric.

match route-type — redistributes routes that match a route type.

match tag — redistributes routes that match a specific tag.

match ip next-hop

To match based on the next-hop IP addresses specified in an IP access list or IP prefix list, configure a filter.

S6000

Syntax

`match ip next-hop {prefix-list prefix-list-name}`

To delete a match, use the `no match ip next-hop {prefix-list prefix-list-name}` command.

Parameters

prefix-list *prefix-list-name*	Enter the keywords `prefix-list` and then enter the name of configured prefix list, up 10 140 characters.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

match interface — redistributes routes that match the next-hop interface.

match ip address — redistributes routes that match an IP address.

match ip route-source — redistributes routes that match routes advertised by other routers.

match metric — redistributes routes that match a specific metric.

match route-type — redistributes routes that match a route type.

match tag — redistributes routes that match a specific tag.

match ip route-source

To match based on the routes advertised by routes specified in IP access lists or IP prefix lists, configure a filter.

S6000

Syntax

`match ip route-source {prefix-list prefix-list-name}`

To delete a match, use the `no match ip route-source {prefix-list prefix-list-name}` command.

Parameters

prefix-list *prefix-list-name*	Enter the keywords `prefix-list` and then enter the name of configured prefix list, up to 140 characters.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

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Version 8.3.7.0	Introduced on the S4810
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names were up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

match interface — redistributes routes that match the next-hop interface.

match ip address — redistributes routes that match an IP address.

match ip next-hop — redistributes routes that match the next-hop IP address.

match metric — redistributes routes that match a specific metric.

match route-type — redistributes routes that match a route type.

match tag — redistributes routes that match a specific tag.

match metric

To match on a specified value, configure a filter.

S6000

Syntax

`match metric metric-value`

To delete a value, use the `no match metric [metric-value]` command.

Parameters

metric-value	Enter a value to match. The range is from zero (0) to 4294967295.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

match interface — redistributes routes that match the next-hop interface.

match ip address — redistributes routes that match an IP address.

match ip next-hop — redistributes routes that match the next-hop IP address.

match ip route-source — redistributes routes that match routes advertised by other routers.

match route-type — redistributes routes that match a route type.

match tag — redistributes routes that match a specific tag.

match origin

To match routes based on the value found in the BGP path ORIGIN attribute, configure a filter.

S6000

Syntax

`match origin {egp | igp | incomplete}`

To disable matching filter, use the `no match origin {igp | egp | incomplete}` command.

Parameters

egp	Enter the keyword `egp` to match routes originating outside the AS.
igp	Enter the keyword `igp` to match routes originating within the same AS.
incomplete	Enter the keyword `incomplete` to match routes with incomplete routing information.

Defaults

Not configured.

Command Modes	ROUTE-MAP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
pre-Version 6.1.1.0	Introduced on the E-Series.

match route-type

To match routes based on the how the route is defined, configure a filter.

S6000

Syntax

```
match route-type {external [type-1 | type-2] | internal |
level-1 | level-2 | local}
```

To delete a match, use the `no match route-type {local | internal | external [type-1 | type-2] | level-1 | level-2}` command.

Parameters

external [type-1| type-2]	Enter the keyword `external` then either type-1 or type-2 to match only on OSPF Type 1 routes or OSPF Type 2 routes.
internal	Enter the keyword `internal` to match only on routes generated within OSPF areas.
level-1	Enter the keyword `level-1` to match IS-IS Level 1 routes.
level-2	Enter the keyword `level-2` to match IS-IS Level 2 routes.
local	Enter the keyword `local` to match only on routes generated within the switch.

Defaults	Not configured.
Command Modes	ROUTE-MAP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

match interface — redistributes routes that match the next-hop interface.

match ip address — redistributes routes that match an IP address.

match ip next-hop — redistributes routes that match the next-hop IP address.

match ip route-source — redistributes routes that match routes advertised by other routers.

match metric — redistributes routes that match a specific metric.

match tag — redistributes routes that match a specific tag.

match tag

To redistribute only routes that match a specified tag value, configure a filter.

S6000

Syntax

`match tag tag-value`

To remove a match, use the `no match tag` command.

Parameters

tag-value	Enter a value as the tag on which to match. The range is from zero (0) to 4294967295.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

match interface — redistributes routes that match the next-hop interface.

match ip address — redistributes routes that match an IP address.

match ip next-hop — redistributes routes that match the next-hop IP address.

match ip route-source — redistributes routes that match routes advertised by other routers.

match metric — redistributes routes that match a specific metric.

match route-type — redistributes routes that match a route type.

route-map

Enable a route map statement and configure its action and sequence number. This command also places you in ROUTE-MAP mode.

S6000

Syntax

`route-map` *`map-name`* `[permit | deny] [`*`sequence-number`*`]`

To delete a route map, use the `no route-map` *`map-name`* `[permit | deny] [`*`sequence-number`*`]` command.

Parameters

map-name	Enter a text string of up to 140 characters to name the route map for easy identification.
permit	(OPTIONAL) Enter the keyword `permit` to set the route map default as permit. If you do not specify a keyword, the default is `permit`.
deny	(OPTIONAL) Enter the keyword `deny` to set the route map default as deny.
sequence-number	(OPTIONAL) Enter a number to identify the route map for editing and sequencing with other route maps. You are

prompted for a sequence number if there are multiple instances of the route map. The range is from 1 to 65535.

Defaults

Not configured.

If you do not define a keyword (`permit` or `deny`) for the route map, the `permit` action is the default.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Use caution when you delete route maps because if you do not specify a sequence number, all route maps with the same *`map-name`* are deleted when you use the `no route-map` *`map-name`* command.

Example

```
Dell(conf)#route-map dempsey
Dell(config-route-map)#
```

Related Commands

show config — displays the current configuration.

set as-path

To modify the AS path for border gateway protocol (BGP) routes, configure a filter.

S6000

Syntax

`set as-path prepend` *`as-number`* `[...` *`as-number`*`]`

To remove an AS-Path setting, use the `no set as-path {prepend` *`as-number`* `| tag}` command.

Parameters

prepend *as-number*	Enter the keyword `prepend` and then enter up to eight AS numbers to be inserted into the BGP path information. The range is from 1 to 65535.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

You can prepend up to eight AS numbers to a BGP route.

This command influences best path selection in BGP by inserting a tag or AS number into the AS_PATH attribute.

Related Commands

match as-path — redistributes routes that match an AS-PATH attribute.

set automatic-tag

To automatically compute the tag value of the route, configure a filter.

S6000

Syntax

```
set automatic-tag
```

To return to the default, enter `no set automatic-tag`.

Defaults	Not configured.
Command Modes	ROUTE-MAP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

set level — specify the OSPF area for route redistribution.

set metric — specify the metric value assigned to redistributed routes.

set metric-type — specify the metric type assigned to redistributed routes.

set tag — specify the tag assigned to redistributed routes.

set comm-list delete

To remove the specified community list from the BGP route’s COMMUNITY attribute, configure a filter.

S6000

Syntax

`set comm-list community-list-name delete`

To insert the community list into the COMMUNITY attribute, use the `no set comm-list community-list-name delete` command.

Parameters

community-list-name	Enter the name of an established Community list, up to 140 characters.

Defaults	Not configured.
Command Modes	ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The community list used in the `set comm-list delete` command must be configured so that each filter contains only one community. For example, the filter `deny 100:12` is acceptable, but the filter `deny 120:13 140:33` results in an error.

If the `set comm-list delete` command and the `set community` command are configured in the same route map sequence, the deletion command (`set comm-list delete`) is processed before the insertion command (`set community`).

Related Commands

match community — redistributes routes that match the COMMUNITY attribute.

set community — specifies a COMMUNITY attribute.

set community

Allows you to assign a BGP COMMUNITY attribute.

S6000

Syntax

`set community {`*`community-number`*` | local-as | no-advertise | no-export | none} [additive]`

To delete a BGP COMMUNITY attribute assignment, use the `no set community {`*`community-number`*` | local-as | no-advertise | no-export | none}` command.

Parameters

community-number	Enter the community number in AA:NN format where AA is the AS number (2 bytes) and NN is a value specific to that autonomous system.
local-AS	Enter the keywords `local-AS` to drop all routes with the COMMUNITY attribute of NO_EXPORT_SUBCONFED. All routes with the NO_EXPORT_SUBCONFED (0xFFFFFF03) community attribute must not be advertised to external BGP peers.
no-advertise	Enter the keywords `no-advertise` to drop all routes containing the well-known community attribute of NO_ADVERTISE. All routes with the NO_ADVERTISE (0xFFFFFF02) community attribute must not be advertised to other BGP peers.
no-export	Enter the keywords `no-export` to drop all routes containing the well-known community attribute of NO_EXPORT. All routes with the NO_EXPORT (0xFFFFFF01) community attribute must not be advertised outside a BGP confederation boundary.
none	Enter the keyword `none` to remove the community attribute from routes meeting the route map criteria.
additive	(OPTIONAL) Enter the keyword `additive` to add the communities to already existing communities.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands	match community — redistributes routes that match the COMMUNITY attribute.

set level

To specify the IS-IS level or OSPF area to which matched routes are redistributed, configure a filter.

S6000

Syntax

```
set level {backbone | level-1 | level-1-2 | level-2 | stub-area}
```

To remove a set level condition, use the `no set level {backbone | level-1 | level-1-2 | level-2 | stub-area}` command.

Parameters

backbone	Enter the keyword `backbone` to redistribute matched routes to the OSPF backbone area (area 0.0.0.0).
level-1	Enter the keyword `level-1` to redistribute matched routes to IS-IS Level 1.
level-1-2	Enter the keyword `level-1-2` to redistribute matched routes to IS-IS Level 1 and Level 2.
level-2	Enter the keyword `level-2` to redistribute matched routes to IS-IS Level 2.
stub-area	Enter the keyword `stub` to redistributed matched routes to OSPF stub areas.

Defaults	Not configured.
Command Modes	ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Dell Networking OS Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

set automatic-tag — computes the tag value of the route.

set metric — specifies the metric value assigned to redistributed routes.

set metric-type — specifies the metric type assigned to redistributed routes.

set tag — specifies the tag assigned to redistributed routes.

set local-preference

To set the BGP LOCAL_PREF attribute for routers within the local autonomous system, configure a filter.

S6000

Syntax

`set local-preference value`

To delete a BGP LOCAL_PREF attribute, use the `no set local-preference` command.

Parameters

value	Enter a number as the LOCAL_PREF attribute value. The range is from 0 to 4294967295.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The `set local-preference` command changes the LOCAL_PREF attribute for routes meeting the route map criteria. To change the LOCAL_PREF for all routes, use the `bgp default local-preference` command.

Related Commands

bgp default local-preference — changes the default LOCAL_PREF attribute for all routes.

set metric

To assign a new metric to redistributed routes, configure a filter.

S6000

Syntax

```
set metric [+ | -] metric-value
```

To delete a setting, enter `no set metric`.

Parameters

+	(OPTIONAL) Enter + to add a metric-value to the redistributed routes.
-	(OPTIONAL) Enter – to subtract a metric-value from the redistributed routes.
metric-value	Enter a number as the new metric value. The range is from zero (0) to 4294967295.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands	set automatic-tag — computes the tag value of the route. set level — specifies the OSPF area for route redistribution. set metric-type — specifies the route type assigned to redistributed routes. set tag — specifies the tag assigned to redistributed routes.

set metric-type

To assign a new route type for routes redistributed to OSPF, configure a filter.

S6000

Syntax

`set metric-type {internal | external | type-1 | type-2}`

To delete a setting, use the `no set metric-type` command.

Parameters

internal	Enter the keyword `internal` to assign the Interior Gateway Protocol metric of the next hop as the route's BGP MULTI_EXIT_DES (MED) value.
external	Enter the keyword `external` to assign the IS-IS external metric.
type-1	Enter the keyword `type-1` to assign the OSPF Type 1 metric.
type-2	Enter the keyword `type-2` to assign the OSPF Type 2 metric.

Defaults Not configured.

Command Modes ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Implemented the keyword `internal`.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

set automatic-tag — computes the tag value of the route.

set level — specifies the OSPF area for route redistribution.

set metric — specifies the metric value assigned to redistributed routes.

set tag — specifies the tag assigned to redistributed routes.

set next-hop

To specify an IP address as the next hop, configure a filter.

S6000

Syntax

`set next-hop ip-address`

To delete the setting, use the `no set next-hop ip-address` command.

Parameters

ip-address	Specify an IP address in dotted decimal format.

Defaults

Not configured.

Command Modes

ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

If you configure the `set next-hop` command, its configuration takes precedence over the `neighbor next-hop-self` command in the ROUTER BGP mode.

If you configure the `set next-hop` command with the interface's IP address (either Loopback or physical), the software declares the route unreachable.

Related Commands	match ip next-hop — redistributes routes that match the next-hop IP address.

set origin

To manipulate the BGP ORIGIN attribute, configure a filter.

S6000

Syntax

```
set origin {igp | egp | incomplete}
```

To delete an ORIGIN attribute setting, use the `no set origin` command.

Parameters

egp	Enter the keyword `egp` to set routes originating from outside the local AS.
igp	Enter the keyword `igp` to set routes originating within the same AS.
incomplete	Enter the keyword `incomplete` to set routes with incomplete routing information.

Defaults	Not configured.
Command Modes	ROUTE-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

set tag

To specify a tag for redistributed routes, configure a filter.

S6000

Syntax	`set tag` *`tag-value`* To delete a setting, use the `no set tag` command.
Parameters	*tag-value* — Enter a number as the tag. The range is from zero (0) to 4294967295.
Defaults	Not configured.
Command Modes	ROUTE-MAP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

set automatic-tag — computes the tag value of the route.

set level — specifies the OSPF area for route redistribution.

set metric — specifies the metric value assigned to redistributed routes.

set metric-type — specifies the route type assigned to redistributed routes.

set weight

To add a non-RFC compliant attribute to the BGP route to assist with route selection, configure a filter.

S6000

Syntax	`set weight` *`weight`* To delete a weight specification, use the `no set weight` *`weight`* command.
Parameters	*weight*: Enter a number as the weight used by the route meeting the route map specification. The range is from 0 to 65535. The default is router-originated = **32768** and all other routes = **0**. When there are multiple routes to the same destination, the routes with a higher weight are preferred.
Defaults	router-originated = **32768**; all other routes = **0**
Defaults	Not configured.
Command Modes	ROUTE-MAP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

If you do not use the `set weight` command, router-originated paths have a weight attribute of 32768 and all other paths have a weight attribute of zero.

show config

Display the current route map configuration.

S6000

Syntax	`show config`
Command Modes	ROUTE-MAP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version	Description
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell(conf-nprefixl)#show config
!
ip prefix-list PL_OSPF_to_RIP
 seq 5 permit 1.1.1.0/24
 seq 10 deny 2.1.0.0/16 ge 23
 seq 25 permit 192.0.0.0 bitmask 192.0.0.0
```

show route-map

Display the current route map configurations.

S6000

Syntax

```
show route-map [map-name]
```

Parameters

map-name	(OPTIONAL) Enter the name of a configured route map, up to 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Increased the name string to accept up to 140 characters. Prior to 7.8.1.0, names are up to 16 characters long.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show route-map
route-map firpo, permit, sequence 10
 Match clauses:
 Set clauses:
  tag 34
Dell#
```

Related Commands

route-map — configures a route map.

deny (for Standard IP ACLs)

To drop packets with a certain IP address, configure a filter.

Syntax

`deny {source | any | host {ip-address}}[count [byte]] [dscp value] [order] [fragments] [log [interval minutes] [threshold-in-msgs [count]] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {source [mask] | any | host ip-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

ip access-list standard — configures a standard ACL.

permit — configures a permit filter.

deny (for Extended IP ACLs)

Configure a filter that drops IP packets meeting the filter criteria.

Syntax

```
deny {ip | ip-protocol-number} {source mask | any | host ip-
address} {destination mask | any | host ip-address} [count
[byte]] [dscp value] [order] [monitor] [fragments] [log
[interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter’s sequence number.
- Use the `no deny {ip |` *`ip-protocol-number`*`} {`*`source mask`* `| any | host` *`ip-address`*`} {`*`destination mask`* `| any | host` *`ip-address`*`}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

deny tcp — Assigns a filter to deny TCP packets.

deny udp — Assigns a filter to deny UDP packets.

ip access-list extended — Creates an extended ACL.

seq (for Standard IPv4 ACLs)

Assign a sequence number to a deny or permit filter in an IP access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {source [mask] | any | host
ip-address}} [count [bytes]] [dscp value] [order] [fragments]
[log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To delete a filter, use the `no seq` *sequence-number* command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

deny — Configures a filter to drop packets.

permit — Configures a filter to forward packets.

deny tcp (for Extended IP ACLs)

Configure a filter that drops transmission control protocol (TCP) packets meeting the filter criteria.

Syntax

```
deny tcp {source mask | any | host ip-address} [bit] [operator
port [port]] {destination mask | any | host ip-address} [dscp]
[bit] [operator port [port]] [count [byte]] [order] [fragments]
[log [interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny tcp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.4(0.0)	Added the support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added the support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

deny — assigns a filter to deny IP traffic.

deny udp — assigns a filter to deny UDP traffic.

deny ether-type (for Extended MAC ACLs)

Configure an egress filter that drops specified types of Ethernet packets on egress ACL supported line cards. (For more information, refer to your line card documentation).

Syntax

```
deny ether-type protocol-type-number {destination-mac-address
mac-address-mask | any} vlan vlan-id {source-mac-address mac-
address-mask | any} [count [byte]] [order] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no deny ether-type` *`protocol-type-number`* `{`*`destination-mac-address mac-address-mask`*` | any} vlan `*`vlan-id`*` {`*`source-mac-address mac-address-mask`*` | any}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny (for Standard MAC ACLs)

To drop packets with a the MAC address specified, configure a filter.

Syntax

`deny {any | mac-source-address [mac-source-address-mask]} [count [byte]] [log [interval minutes] [threshold-in-msgs [count]][monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | mac-source-address mac-source-address-mask}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History

Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

permit — configures a MAC address filter to pass packets.

seq — configures a MAC address filter with a specified sequence number.

deny (for Extended MAC ACLs)

To drop packets that match the filter criteria, configure a filter.

Syntax

```
deny {any | host mac-address | mac-source-address mac-source-
address-mask} {any | host mac-address | mac-destination-address
mac-destination-address-mask} [ethertype-operator] [count
[byte]][log [interval minutes] [threshold-in-msgs [count]]
[monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny {any | host mac-address | mac-source-address mac-source-address-mask} {any | host mac-address | mac-destination-address mac-destination-address-mask}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-MAC ACCESS LIST-EXTENDED

Command History

Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands	permit — configures a MAC address filter to pass packets. seq — configures a MAC address filter with a specified sequence number.

permit (for Standard IP ACLs)

To permit packets from a specific source IP address to leave the switch, configure a filter.

Syntax

```
permit {source [mask]| any | host ip-address} [count [byte]]
[dscp value] [order] [fragments] [log [interval minutes]
[threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no permit {`*`source`*` [`*`mask`*`] | any | host `*`ip-address`*`}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

deny — Assigns a IP ACL filter to deny IP packets.

ip access-list standard — Creates a standard ACL.

permit arp (for Extended MAC ACLs)

Configure a filter that forwards ARP packets meeting this criteria. This command is supported only on 12-port GE line cards with SFP optics; refer to your line card documentation for specifications.

Syntax

```
permit arp {destination-mac-address mac-address-mask | any}
vlan vlan-id {ip-address | any | opcode code-number} [count
[byte]] [order] [fragments] [log [interval minutes] [threshold-
in-msgs [count]][monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter’s sequence number.
- Use the `{destination-mac-address mac-address-mask | any} vlan vlan-id {ip-address | any | opcode code-number}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

permit ether-type (for Extended MAC ACLs)

Configure a filter that allows traffic with specified types of Ethernet packets. This command is supported only on 12-port GE line cards with SFP optics. For specifications, refer to your line card documentation.

Syntax

```
permit ether-type protocol-type-number {destination-mac-address
mac-address-mask | any} vlan vlan-id {source-mac-address mac-
address-mask | any} [count [byte]] [order] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter’s sequence number.
- Use the `no permit ether-type` *`protocol-type-number`* `{`*`destination-mac-address mac-address-mask`* `| any} vlan` *`vlan-id`* `{`*`source-mac-address mac-address-mask`* `| any}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

permit icmp (for Extended IP ACLs)

Configure a filter to allow all or specific ICMP messages.

Syntax

```
permit icmp {source mask | any | host ip-address} {destination
mask | any | host ip-address} [dscp] [message-type] [count
[byte]] [order] [fragments] [log [interval minutes] [threshold-
in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no permit icmp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-STANDARD-ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

permit udp (for Extended IP ACLs)

To pass UDP packets meeting the filter criteria, configure a filter.

Syntax

```
permit udp {source mask | any | host ip-address} [operator port
[port]] {destination mask | any | host ip-address} [dscp]
[operator port [port]] [count [byte]] [order] [fragments] [log
[interval minutes] [threshold-in-msgs [count]][monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter’s sequence number.
- Use the `no permit udp {`*`source mask`*` | any | host `*`ip-address`*`} {`*`destination mask`*` | any | host `*`ip-address`* command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

ip access-list extended — creates an extended ACL.

permit — assigns a permit filter for IP packets.

permit tcp — assigns a permit filter for TCP packets.

permit (for Extended IP ACLs)

To pass IP packets meeting the filter criteria, configure a filter.

Syntax

```
permit {source mask | any | host ip-address} {destination mask
| any | host ip-address} [count [bytes]] [dscp value] [order]
[fragments] [log [interval minutes] [threshold-in-msgs [count]]
[monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no deny {`*`source mask`*` | any | host `*`ip-address`*`} {`*`destination mask`*` | any | host `*`ip-address`*`}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.4(0.0)	Added the support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added the support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, standard and extended IPv6 ACLs, and standard and extended MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

ip access-list extended — creates an extended ACL.

permit tcp — assigns a permit filter for TCP packets.

permit udp — assigns a permit filter for UDP packets.

permit (for Standard MAC ACLs)

To forward packets from a specific source MAC address, configure a filter.

Syntax

```
permit {any | mac-source-address [mac-source-address-mask]}
[count [byte]] | [log [interval minutes] [threshold-in-msgs
[count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq` *`sequence-number`* command if you know the filter's sequence number.
- Use the `no permit {any |` *`mac-source-address mac-source-address-mask`*`}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

deny — configures a MAC ACL filter to drop packets.

seq —configure a MAC ACL filter with a specified sequence number.

seq (for Standard MAC ACLs)

To a deny or permit filter in a MAC access list while creating the filter, assign a sequence number.

Syntax

```
seq sequence-number {deny | permit} {any | mac-source-address
[mac-source-address-mask]} [count [byte]] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, use the `no seq` *`sequence-number`* command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-MAC ACCESS LIST-STANDARD

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

deny — configures a filter to drop packets.

permit — configures a filter to forward packets.

permit tcp (for Extended IP ACLs)

To pass TCP packets meeting the filter criteria, configure a filter.

Syntax

```
permit tcp {source mask | any | host ip-address} [bit]
[operator port [port]] {destination mask | any | host ip-
address} [bit] [dscp] [operator port [port]] [count [byte]]
[order] [fragments] [log [interval minutes] [threshold-in-msgs
[count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit tcp {source mask | any | host ip-address} {destination mask | any | host ip-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

ip access-list extended — creates an extended ACL.

permit — assigns a permit filter for IP packets.

permit udp — assigns a permit filter for UDP packets.

seq arp (for Extended MAC ACLs)

Configure an egress filter with a sequence number that filters ARP packets meeting this criteria. This command is supported only on 12-port GE line cards with SFP optics. For specifications, refer to your line card documentation.

NOTE: Only the options that have been newly introduced in Release 9.3(0.0) and Release 9.4(0.0) are described here. For a complete description on all of the keywords and variables that are available with this command, refer the topic of this command discussed earlier in this guide.

Syntax

```
seq sequence-number {deny | permit} arp {destination-mac-
address mac-address-mask | any} vlan vlan-id {ip-address | any
| opcode code-number} [count [byte]] [order] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, use the no seq *sequence-number* command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. You can enter a threshold in the range of 1-100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. You can enter an interval in the range of 1-10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, Z9000, and MXL 10/40GbE Switch IO Module platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, Z9000, and MXL 10/40GbE Switch IO Module platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is reenabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is reenabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, standard and extended IPv6 ACLs, and standard and extended MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

seq ether-type (for Extended MAC ACLs)

Configure an egress filter with a specific sequence number that filters traffic with specified types of Ethernet packets. This command is supported only on 12-port GE line cards with SFP optics. For specifications, refer to your line card documentation.

NOTE: Only the options that have been newly introduced in Release 9.3(0.0) and Release 9.4(0.0) are described here. For a complete description on all of the keywords and variables that are available with this command, refer the topic of this command discussed earlier in this guide.

Syntax

```
seq sequence-number {deny | permit} ether-type protocol-type-
number {destination-mac-address mac-address-mask | any} vlan
vlan-id {source-mac-address mac-address-mask | any} [count
[byte]] [order] [log [interval minutes] [threshold-in-msgs
[count]] [monitor]
```

To remove this filter, use the no seq *sequence-number* command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. You can enter a threshold in the range of 1-100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. You can enter an interval in the range of 1-10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, Z9000, and MXL 10/40GbE Switch IO Module platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, Z9000, and MXL 10/40GbE Switch IO Module platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is reenabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is reenabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, standard and extended IPv6 ACLs, and standard and extended MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and

Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

seq (for IP ACLs)

Assign a sequence number to a deny or permit filter in an extended IP access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {ip-protocol-number | icmp
| ip | tcp | udp} {source mask | any | host ip-address}
{destination mask | any | host ip-address} [operator port
[port]] [count [byte]] [dscp value] [order] [fragments] [log
[interval minutes] [threshold-in-msgs [count]] [monitor]
```

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or deny commands. The threshold range is from 1 to 100..
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

deny — configures a filter to drop packets.

permit — configures a filter to forward packets.

seq (for IPv6 ACLs)

Assign a sequence number to a deny or permit the filter in an IPv6 access list while creating the filter.

Syntax

```
seq sequence-number {deny | permit} {ipv6-protocol-number |
icmp | ip | tcp | udp} {source address mask | any | host ipv6-
address} {destination address | any | host ipv6-address}
[operator port [port]] [count [byte]] [log [interval minutes]
[threshold-in-msgs [count]] [monitor]
```

To delete a filter, use the `no seq sequence-number` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminate with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.

monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

permit – configures a filter to forward packets.

permit udp (for IPv6 ACLs)

Configure a filter to pass UDP packets meeting the filter criteria.

Syntax

```
permit udp {source address mask | any | host ipv6-address}
[operator port [port]] {destination address | any | host ipv6-
address} [operator port [port]] [count [byte]] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit udp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

permit – assigns a permit filter for IP packets.

permit tcp (for IPv6 ACLs)

Configure a filter to pass TCP packets that match the filter criteria.

Syntax

```
permit tcp {source address mask | any | host ipv6-address}
[operator port [port]] {destination address | any | host ipv6-
address} [bit] [operator port [port]] [count [byte]] [log
[interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit tcp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.

monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the `flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

Related Commands

permit – assigns a permit filter for IP packets.

permit icmp (for IPv6 ACLs)

To allow all or specific internet control message protocol (ICMP) messages, configure a filter.

Syntax

```
permit icmp {source address mask | any | host ipv6-address}
{destination address | any | host ipv6-address} [message-type]
[count [byte]] [log [interval minutes] [threshold-in-msgs
[count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit icmp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

permit (for IPv6 ACLs)

To configure a filter that matches the filter criteria, select an IPv6 protocol number, ICMP, IPv6, TCP, or UDP.

Syntax

```
permit {ipv6-protocol-number | icmp | ipv6 | tcp | udp} [count
[byte]] [dscp value] [order] [fragments] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no permit {ipv6-protocol-number | icmp | ipv6 | tcp | udp}` command

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the`flow-based enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny udp (for IPv6 ACLs)

Configure a filter to drop user datagram protocol (UDP) packets meeting the filter criteria.

Syntax

```
deny udp {source address mask | any | host ipv6-address}
[operator port [port]] {destination address | any | host ipv6-
address} [operator port [port]] [count [byte]] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter’s sequence number

- Use the `no deny udp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The threshold range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, Z9000, and MXL 10/40GbE Switch IO Module platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, Z9000, and MXL 10/40GbE Switch IO Module platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs.

You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny arp (for Extended MAC ACLs)

Configure an egress filter that drops ARP packets on egress ACL supported line cards. (For more information, refer to your line card documentation).

Syntax

```
deny arp {destination-mac-address mac-address-mask | any} vlan
vlan-id {ip-address | any | opcode code-number} [count [byte]]
[order] [log [interval minutes] [threshold-in-msgs [count]]
[monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no deny arp {destination-mac-address mac-address-mask | any} vlan vlan-id {ip-address | any | opcode code-number}` command.

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated with the `seq`, `permit`, or `deny` commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes	CONFIGURATION-EXTENDED-ACCESS-LIST

Command History

Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny tcp (for IPv6 ACLs)

Configure a filter that drops TCP packets that match the filter criteria.

Syntax

```
deny tcp {source address mask | any | host ipv6-address}
[operator port [port]] {destination address | any | host ipv6-
address} [bit] [operator port [port]] [count [byte]] [log
[interval minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter’s sequence number

- Use the `no deny tcp {`*`source address mask`*` | any | host `*`ipv6-address`*`} {`*`destination address`*` | any | host `*`ipv6-address`*`}` command

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. The threshold range is from 1 to 100..
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny icmp (for Extended IPv6 ACLs)

Configure a filter to drop all or specific ICMP messages.

NOTE: Only the options that have been newly introduced in Release 9.3(0.0) and Release 9.4(0.0) are described here. For a complete description on all of the keywords and variables that are available with this command, refer the topic of this command discussed earlier in this guide.

Syntax

```
deny icmp {source address mask | any | host ipv6-address}
{destination address | any | host ipv6-address} [message-type]
[count [byte]] | [log [interval minutes] [threshold-in-msgs
[count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no deny icmp {source address mask | any | host ipv6-address} {destination address | any | host ipv6-address}` command

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.
threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the seq, permit, or deny commands. You can enter a threshold in the range of 1-100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. You can enter an interval in the range of 1-10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is 5 minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.3.0.0	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based enable command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

deny (for IPv6 ACLs)

Configure a filter that drops IPv6 packets that match the filter criteria.

Syntax

```
deny {ipv6-protocol-number | icmp | ipv6 | tcp | udp} [count
[byte]] [dscp value] [order] [fragments] [log [interval
minutes] [threshold-in-msgs [count]] [monitor]
```

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no deny {ipv6-protocol-number | icmp | ipv6 | tcp | udp}` command

Parameters

log	(OPTIONAL) Enter the keyword `log` to enable the triggering of ACL log messages.

threshold-in msgs *count*	(OPTIONAL) Enter the `threshold-in-msgs` keyword followed by a value to indicate the maximum number of ACL logs that can be generated, exceeding which the generation of ACL logs is terminated. with the `seq`, `permit`, or deny commands. The threshold range is from 1 to 100.
interval *minutes*	(OPTIONAL) Enter the keyword `interval` followed by the time period in minutes at which ACL logs must be generated. The time interval range is from 1 to 10 minutes.
monitor	(OPTIONAL) Enter the keyword `monitor` when the rule is describing the traffic that you want to monitor and the ACL in which you are creating the rule is applied to the monitored interface.

Defaults

By default, 10 ACL logs are generated if you do not specify the threshold explicitly.

The default frequency at which ACL logs are generated is five minutes. By default, flow-based monitoring is not enabled.

Command Modes

ACCESS-LIST

Command History

Version 9.3(0.0)	Added support for logging of ACLs on the S4810, S4820T, and Z9000 platforms.
Version 9.4(0.0)	Added support for flow-based monitoring on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

When the configured maximum threshold is exceeded, generation of logs is stopped. When the interval at which ACL logs are configured to be recorded expires, the subsequent, fresh interval timer is started and the packet count for that new interval commences from zero. If ACL logging was stopped previously because the configured threshold is exceeded, it is re-enabled for this new interval.

If ACL logging is stopped because the configured threshold is exceeded, it is re-enabled after the logging interval period elapses. ACL logging is supported for standard and extended IPv4 ACLs, IPv6 ACLs, and MAC ACLs. You can configure ACL logging only on ACLs that are applied to ingress interfaces; you cannot enable logging for ACLs that are associated with egress interfaces.

You can activate flow-based monitoring for a monitoring session by entering the flow-based `enable` command in the Monitor Session mode. When you enable this capability, traffic with particular flows that are traversing through the ingress and egress interfaces are examined and, appropriate ACLs can be applied in both the ingress and egress direction. Flow-based monitoring conserves bandwidth by monitoring only specified traffic instead all traffic on the interface. This feature is particularly useful when looking for malicious traffic. It is available for Layer 2 and Layer 3 ingress and egress traffic. You may specify traffic using standard or extended access-lists. This mechanism copies all incoming or outgoing packets on one port and forwards (mirrors) them to another port. The source port is the monitored port (MD) and the destination port is the monitoring port (MG).

7

Bidirectional Forwarding Detection (BFD)

Bidirectional forwarding detection (BFD) is a detection protocol that provides fast forwarding path failure detection.

The Dell Networking operating software implementation is based on the standards specified in the IETF Draft draft-ietf-bfd-base-03 and supports BFD on all Layer 3 physical interfaces including VLAN interfaces

and port-channels

BFD is supported on the S6000 platform.

bfd all-neighbors

Enable BFD sessions with all neighbors discovered by Layer 3 protocols virtual router redundancy protocol (VRRP), intermediate system to intermediate system (IS-IS), open shortest path first (OSPF), OSPFv3, or border gateway protocol (BGP) on router interfaces, and (optionally) reconfigure the default timer values.

S6000

Syntax

```
bfd all-neighbors [interval interval min_rx min_rx multiplier
value role {active | passive}]
```

Parameters

interval *milliseconds*	(OPTIONAL) Enter the keyword `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **100**.
min_rx *milliseconds*	Enter the keyword `min_rx` to specify the minimum rate at which the local system would like to receive control packets from the remote system. The range is from 50 to 100. The default is **100**.
multiplier *value*	Enter the keyword `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — The active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — The passive system does not initiate a session. It only responds to a request for session initialization from the active system.

The default is **active**.

Defaults

Refer to *Parameters*.

Command Modes

ROUTER OSPF

ROUTER OSPFv3

ROUTER BGP

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2.(0.0)	Introduced BFD for VRRP and OSPFv3 on Z9000, S4810, and S4820T.
Version 9.0.0.0	Introduced BFD for BGP on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced BFD for BGP on the S4810.
Version 8.4.1.3	Introduced BFD for BGP on the E-Series ExaScale.
Version 8.2.1.0	Introduced BFD for OSPF and ISIS on the E-Series ExaScale.
Version 7.6.1.0	Introduced BFD for OSPF on the C-Series.
Version 7.5.1.0	Introduced BFD for ISIS on the E-Series.
Version 7.4.1.0	Introduced BFD for OSPF on the E-Series.

Usage Information

All neighbors inherit the timer values configured with the `bfd neighbor` command except in the following cases:

- Timer values configured with the `isis bfd all-neighbors` or `ip ospf bfd all-neighbors` commands in INTERFACE mode override timer values configured with the `bfd neighbor` command. Likewise, using the `no bfd neighbor` command does not disable BFD on an interface if you explicitly enable BFD using the `isis bfd all-neighbors` command.
- Neighbors that have been explicitly enabled or disabled for a BFD session with the `bfd neighbor` or `neighbor bfd disable` commands in ROUTER BGP mode do not inherit the global BFD enable/disable values configured with the `bfd neighbor` command or configured for the peer group to which a neighbor belongs. The neighbors inherit only the global timer values (configured with the `bfd neighbor` command).

You can only enable BFD for VRRP in INTERFACE command mode (`vrrp bfd all-neighbors`).

Related Commands	neighbor bfd disable — Explicitly disables a BFD session with a BGP neighbor or a BGP peer group.

ip route bfd

Enable BFD for all neighbors configured through static routes.

S6000

Syntax

`ip route bfd [interval` *`interval`* `min_rx` *`min_rx`* `multiplier` *`value`* `role {active | passive}]`

To disable BFD for all neighbors configured through static routes, use the `no ip route bfd [interval` *`interval`* `min_rx` *`min_rx`* `multiplier` *`value`* `role {active | passive}]` command.

Parameters

interval *milliseconds*	(OPTIONAL) Enter the keywords `interval` to specify non-default BFD session parameters beginning with the transmission interval. The range is from 50 to 1000. The default is **100**.
min_rx *milliseconds*	Enter the keywords `min_rx` to specify the minimum rate at which the local system receives control packets from the remote system. The range is from 50 to 1000. The default is **100**.
multiplier *value*	Enter the keywords `multiplier` to specify the number of packets that must be missed in order to declare a session down. The range is from 3 to 50. The default is **3**.
role [active | passive]	Enter the role that the local system assumes: • `Active` — The active system initiates the BFD session. Both systems can be active for the same session. • `Passive` — The passive system does not initiate a session. It only responds to a request for session initialization from the active system. The default is **Active**.

Defaults	See Parameters
Command Modes	CONFIGURATION

Command History

Version 9.3. (0.0)	Introduced on S6000.

Version 9.2.(0.0)	Introduced on Z9000, S4810, and S4820T.
Version 8.2.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

neighbor bfd

Explicitly enable a BFD session with a BGP neighbor or a BGP peer group.

S6000

Syntax

`neighbor {ip-address | peer-group-name} bfd`

Parameters

ip-address	Enter the IP address of the BGP neighbor that you want to explicitly enable for BFD sessions in dotted decimal format (A.B.C.D).
peer-group-name	Enter the name of the peer group that you want to explicitly enable for BFD sessions.

Defaults

none

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.
Version 8.4.1.3	Introduced on the E-Series ExaScale.

Usage Information

When you enable a BFD session with a specified BGP neighbor or peer group using the `bfd neighbor` command, the default BFD session parameters are used (interval: **100** milliseconds, min_rx: **100** milliseconds, multiplier: **3** packets, and role: **active**) if you have not specified parameters with the `bfd neighbor` command.

When you explicitly enable a BGP neighbor for a BFD session with the `bfd neighbor` command:

- The neighbor does not inherit the global BFD enable values configured with the `bfd neighbor` command or configured for the peer group to which the neighbor belongs.
- The neighbor only inherits the global timer values configured with the `bfd neighbor` command: interval, min_rx, and multiplier.

Related Commands	neighbor bfd disable — Explicitly disables a BFD session with a BGP neighbor or a BGP peer group.

neighbor bfd disable

Explicitly disable a BFD session with a BGP neighbor or a BGP peer group.

S6000

Syntax `neighbor {`*`ip-address`*` | `*`peer-group-name`*`} bfd disable`

Parameters

ip-address	Enter the IP address of the BGP neighbor that you want to explicitly disable for BFD sessions in dotted decimal format (A.B.C.D).
peer-group-name	Enter the name of the peer group that you want to explicitly disable for BFD sessions.

Defaults none

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.
Version 8.4.1.3	Introduced on the E-Series ExaScale.

Usage Information

When you explicitly disable a BGP neighbor for a BFD session with the `neighbor bfd disable` command:

- The neighbor does not inherit the global BFD disable values configured with the `bfd neighbor` command or configured for the peer group to which the neighbor belongs.
- The neighbor only inherits the global timer values configured with the `bfd neighbor` command: interval, min_rx, and multiplier.

When you remove the Disabled state of a BFD for a BGP session with a specified neighbor by entering the `no neighbor bfd disable` command, the BGP link with the neighbor returns to normal operation and uses the BFD session parameters globally configured with the `bfd neighbor` command or configured for the peer group to which the neighbor belongs.

Related Commands	neighbor bfd — Explicitly enables a BFD session with a BGP neighbor or a BGP peer group.

8

Boot Command Line Interface

BCLI commands are supported on the S6000 platform only.

S6000

To access this BOOT_USER mode, first boot your Dell Networking platform. When you see the “Press ESC to stop auto-boot”, `press the ESC key to log into BCLI`

You enter `BOOT_USER` mode immediately, as indicated by the `BOOT_USER#` prompt.

NOTE: All commands in this chapter are in `Boot_User` mode. These commands are supported on the Dell Networking platform.

You cannot use the Tab key to complete commands in this mode.

boot change

Change the primary, secondary, or default Dell Networking OS boot configuration.

S6000

Syntax	**boot change** *`primary	secondary	default}`*	
Parameters	*primary*	Enter the keyword **primary** to configure the boot parameters used in the first attempt to boot Dell Networking OS.
	secondary	Enter the keyword **secondary** to configure boot parameters used if the primary operating system boot selection is not available.
	default	Enter the keyword **default** to configure boot parameters used if the secondary operating system boot parameter selection is not available. You can configure this option to any of the available type, for example flash/usb/ftp/tftp.
Defaults	None	

Command Modes

BOOT_USER

Command History

Version 9.0.2.0	Introduced on the S6000.

Usage Information

After entering the `boot change` command and selecting the parameters, press **Enter**. The software prompts you to enter the following:

- The boot device (flash, ftp, tftp, or usbflash), image file name, IP address of the server containing the image, username, and password (only for ftp).

Note When you enter a new parameter that extends beyond 80 characters, you cannot use the **Backspace** key to correct any mistakes. If you make a mistake, you must re-enter the parameter.

Note: You must set the IP address of the designated download port before you execute this command. Otherwise, an second statement message alerts you that the configuration cannot proceed.

shows the first field after you enter **boot change primary**. At this point:

- Press **Enter** to accept the information already configured, or
- Change that information. To do so, press the . (period) key and enter new information. After you enter the information, press **Enter**.

Example

```
BOOT_USER # boot change primary
boot device : ftp
```

shows the completed command:

```
BOOT_USER # boot change primary
'.' = clear field; '-' = go to previous field
boot device : ftp
file name : tt/latestlabel
Server IP address : 10.16.1.200
username : amsterdam
password : ******
BOOT_USER #
```

To view the current boot configuration, use the **show bootvar** command.

Related Commands

boot_zero — Remove the primary, secondary, or default boot image configuration.

show_bootvar — Display boot configuration information.

boot message

Use this command to enable/disable boot logs during reload.

S6000

Syntax	**boot message *on* | *off***
Parameters	

on	Enter the keyword **on** to turn on boot logs during reload.
off	Enter the keyword **off** to suppress the boot logs during reload.

NOTE: By default, watchdog is disabled.

Defaults	None
Command Modes	BOOT_USER
Command History	

Version 9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER #boot message
boot messages off
BOOT_USER #
```

boot show net config retries

Show the number of retries for network boot configuration failure.

S6000

Syntax	**boot show net config retries**
Command Modes	BOOT_USER
Command History	

Version 9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER #boot show net config retries
Number of Network Boot Config Retries is : 0
BOOT_USER #
```

boot write net config retries

Set the number of retries for network boot configuration failure.

S6000

Syntax	**boot write net config retries** `<int>`
Command Modes	BOOT_USER
Command History	Version 9.0.2.0 — Introduced on the S6000.

Example

```
BOOT_USER # boot write net config retries 2
Updated number of Network Boot Config retries to 2
BOOT_USER #
```

boot zero

Erase the configured primary, secondary, or default boot image parameters. If you erase all three parameters, the S6000 switch boots from its internal Flash.

S6000

Syntax: **boot zero** *`primary | secondary | default}`*

Parameters

primary	Enter the keyword **primary** to configure the boot parameters used in the first attempt to boot the system.
secondary	Enter the keyword **secondary** to configure boot parameters used if the primary operating system boot selection is not available.
default	Enter the keyword **default** to configure boot parameters used if the secondary operating system boot parameter selection is not available. You can configure this option to any of the available type, for example flash/usb/ftp/tftp.

Defaults	None
Command Modes	BOOT_USER
Command History	Version 9.0.2.0 — Introduced on the S6000.

Usage Information

This command reverses changes made with the **boot change** command.

```
BOOT_USER # boot zero primary

BOOT_USER # boot zero secondary

BOOT_USER # boot zero default

BOOT_USER # show bootvar

PRIMARY OPERATING SYSTEM BOOT PARAMETERS:

=========================================

No Operating System boot parameters specified!

SECONDARY OPERATING SYSTEM BOOT PARAMETERS:

===========================================

No Operating System boot parameters specified!

DEFAULT OPERATING SYSTEM BOOT PARAMETERS:

=========================================

No Operating System boot parameters specified!

BOOT_USER #
```

Related Commands

boot_change— Change the primary, secondary, or default boot image configuration.

default-gateway

Assign an IP address as the default gateway for the system.

S6000

Syntax

`[no] default-gateway ip-address`

Parameters

ip-address	Enter the **IP address** of the gateway router in dotted decimal format (A.B.C.D).

Command Modes

BOOT_USER

Command History	Version 9.0.2.0 — Introduced on the S6000.
Usage Information	Use the **show default-gateway** command to view the current default gateway.
Related Commands	show_default-gateway— Change the primary, secondary, or default boot image configuration.

etheraddr <macaddr>

Assign the management port MAC address.

S6000

Syntax	**etheraddr <macaddr>**
Parameters	*mac-address* — Enter a **MAC address** in standard format.
Command Modes	BOOT_ADMIN
Command History	Version 9.0.2.0 — Introduced on the S6000.
Usage Information	Use this command to assign a MAC address if FTOS cannot find a default MAC address.

Example

```
BOOT_ADMIN # etheraddr aa:aa:aa:aa:aa:aa
```

<Macaddr> XX:xx:xx:xx:xx:xx

No defaults for this

ignore enable-password

Reload the system software without the enable password configured.

S6000

Syntax	**ignore enable-password**
Command Modes	BOOT_USER

Command History	**Version 9.0.2.0** Introduced on the S6000.
Usage Information	When you enter the **reload** command and the system reboots, you will not be prompted for a password to enter the EXEC Privilege mode (normally you are required to enter the enable command). If your console or Telnet session expires after you used the **ignore enable-password** command, you are prompted for an **enable** password when you re-establish the session
Related Commands	reload — Exit from this mode and reload FTOS.

ignore startup-config

During a reload, do not load the startup-config file.

S6000

Syntax	**ignore startup-config**
Defaults	disabled
Command Modes	BOOT_USER
Command History	**Version 9.0.2.0** Introduced on the S6000.
Usage Information	Use this command if you have authentication procedures in the startup-config other than the enable-password setting.

interface management ethernet ip address

Assign an IP address to the Management Ethernet interface.

S6000

Syntax	**[no]** **interface management ethernet ip address** *ip-address mask* To delete the IP address, enter **no interface management ethernet ip address**.
Defaults	Not configured.

Command Modes	BOOT_USER
Command History	Version 9.0.2.0 — Introduced on the S6000.
Usage Information	In the runtime CLI, use the **ip address** command in INTERFACE mode to change the Management interface's IP address. To view the current IP address configured on the Management interface, enter the show interfaces **management ethernet** command
Related Commands	show_default-gateway — Display the IP address configured for the default gateway. show_interface_mangement_ethernet— Display the IP address configured for the Management interface.

NVRAM erase

Erase all NVRAM contents alone.

S6000

Syntax **nvram erase**

Parameters

mac-address	Enter a **MAC address** in standard format.

Command Modes BOOT_ADMIN

Command History

Version 9.0.2.0	Introduced on the S6000.

Usage Information Use this command to assign a MAC address if FTOS cannot find a default MAC address.

Example

```
BOOT_USER # BOOT_ADMIN # nvram erase
Are you sure (y/n)? : yes
Erasing NVRAM sectors....Erasing NvRam of size 1024 KB ... DONE
```

reload

Exit from this mode and reload Dell Networking OS.

S6000

Syntax	**reload**
Command Modes	BOOT_USER
Command History	Version 9.0.2.0 — Introduced on the S6000.

serial console

Use the serial console to set the serial console baud rate.

S6000

Syntax **serial console <int> <int>**

Parameters

serial console [unit] [baud]	Enter the keyword to set the serial port baud rate. The supported values for serial console: • Unit - 0 • Baud rate -9600,115200 No defaults.

Command Modes BOOT_USER

Command History	Version 9.0.2.0 — Introduced on the S6000.

Example Serial

```
BOOT_USER # serial console 0 9600

BOOT_USER # BOOT_USER #
```

show bootvar

Display boot configuration information.

S6000

Syntax

show bootvar

Command Modes

BOOT_USER

Command History

Version 9.0.2.0	Introduced on the S6000.

Example

```
BOOT_USER # show bootvar

PRIMARY OPERATING SYSTEM BOOT PARAMETERS:

==============================================

No Operating System boot parameters specified!

SECONDARY OPERATING SYSTEM BOOT PARAMETERS:

==============================================

boot device : flash

file name : systema (FTOS system://A Partition)

DEFAULT OPERATING SYSTEM BOOT PARAMETERS:

==============================================

boot device : tftp

file name : PS-SI-9-0-0-566.bin

Management Etherenet IP address : 10.16.133.17

Mask : 255.255.0.0

Server IP address : 10.16.1.200

Default Gateway IP address : 10.16.1.254

BOOT_USER #
```

Related Commands

boot_change— Change the primary, secondary, or default boot image configuration.

boot_zero — Erase the configured primary, secondary, or default boot image parameters.

show default-gateway

Display the IP address configured for the default gateway.

S6000

Syntax	**show default-gateway**
Command Modes	BOOT_USER
Command History	Version 9.0.2.0 Introduced on the S6000.

Example

```
BOOT_USER # show default-gateway
```

Gateway IP address: 10.16.100.254

BOOT_USER #

Related Commands

default-gateway— Configure the IP address for the default gateway.

interface_management_ethernet_ip_address — Assign an IP address to the Management Ethernet interface.

show interface management ethernet

Display the IP address configured for the Management interface.

S6000

Syntax	**show interface management ethernet**
Command Modes	BOOT_USER
Command History	Version 9.0.2.0 Introduced on the S6000.

Example

```
BOOT_USER # show interfaces management ethernet
Management ethernet IP address: 10.16.133.17/24
BOOT_ADMIN #
```

On the S6000, the output of this command includes the MAC address and port number of the assigned management port.

Example

```
BOOT_ADMIN # show int man eth
Management ethernet IP address: 10.16.132.4/16
BOOT_ADMIN #
```

Related Commands	interface_management_ethernet_ip_address — Assign an IP address to the Management Ethernet interface. reload — Configure speed, duplex, and negotiation settings for the management interface.

show serial console baud rate

Use the show serial console to show the values of the serial console baud rate.

S6000

Syntax	**show serial console baudrate**
Command Modes	BOOT_USER
Command History	Version 9.0.2.0 — Introduced on the S6000.

Example

```
BOOT_USER # show serial console baudrate
Serial console baudrate = 9600
```

watchdog <string>

Enable the watchdog timer, when the enabled watchdog timer is set to 60 seconds.

S6000

Syntax

<string> `enable | disable | status | timeout | settimeout watchdog timer`

Parameters

enable	Enter the keyword **enable** to enable the watchdog.
disable	Enter the keyword **disable** to disable the watchdog.
status	Enter the keyword **status** to see the watchdog status.
timeout	Enter the keyword **timeout** to see the timeout configured for the watchdog.
settimeout	Enter the keyword **set timeout** to set timeout.

NOTE: By default, watchdog is disabled.

Command Modes BOOT_ADMIN

Command History

Version 9.0.2.0	Introduced on the S6000.

Example

```
Boot_user#BOOT_ADMIN # watchdog status

WATCHDOG DISABLED

BOOT_ADMIN # watchdog enable

WATCHDOG ENABLED

BOOT_ADMIN # watchdog status

WATCHDOG ENABLED

BOOT_ADMIN # watchdog timeout

WATCHDOG TIMEOUT: 60
```

9

Border Gateway Protocol

BGP is an external gateway protocol that transmits interdomain routing information within and between autonomous systems (AS). BGP version 4 (BGPv4) supports classless inter-domain routing (CIDR) and the aggregation of routes and AS paths. Basically, two routers (called neighbors or peers) exchange information including full routing tables and periodically sent messages to update those routing tables.

BGP is supported in Dell Networking OS version 9.0.2.0 for the S6000 platform

NOTE: For more information about configuring the border gateway protocol (BGP), refer to the BGP chapter in the *Dell Networking OS Configuration Guide*.

This chapter contains the following sections:

- BGPv4 Commands
- MBGP Commands
- BGP Extended Communities (RFC 4360)
- IPv6 BGP Commands

BGP IPv4 Commands

Border Gateway Protocol (BGP) is an external gateway protocol that transmits interdomain routing information within and between Autonomous Systems (AS). BGP supports classless interdomain routing (CIDR) and the aggregation of routes and AS paths. Basically, two routers (called neighbors or peers) exchange information including full routing tables and periodically send messages to update those routing tables.

NOTE: Dell Networking OS supports 2-byte (16-bit) and 4-byte (32-bit) format for autonomous system numbers (ASNs), where the 2-byte format is 1 to 65535 and the 4-byte format is 1 to 4294967295.

NOTE: Dell Networking OS supports dotted format as well as the traditional plain format for AS numbers. The dot format is displayed when using the `show ip bgp` commands. To determine the comparable dot format for an ASN from a traditional format, use ASN/65536. ASN%65536. For more information about using the 2– or 4-byte format, refer to the *Dell Networking OS Configuration Guide*.

address-family

Enable the IPv4 multicast or the IPv6 address family.

S6000

Syntax	`address-family [ipv4 {multicast	vrf` *`vrf-name`*`}	ipv6 unicast]`
Parameters	

ipv4 multicast	Enter the keyword `ipv4` followed by the keyword `multicast` to enable BGPv4 multicast mode.

ipv4 vrf *vrf-name*	Enter the keyword `ipv4` followed by the keyword `vrf` and then the name of the VRF to enable VRF mode. NOTE: Use this attribute to start a BGP instance corresponding to either a specific address family in a default VRF or an IPv4 address family in a non-default VRF.
ipv6 unicast	Enter the keyword `ipv6` followed by the keyword `unicast` to enable BGPv6 mode.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.5.1.0	Introduced

aggregate-address

To minimize the number of entries in the routing table, summarize a range of prefixes.

S6000

Syntax

```
aggregate-address ip-address mask [advertise-map map-name] [as-set] [attribute-map map-name] [summary-only] [suppress-map map-name]
```

Parameters

ip-address mask	Enter the IP address and mask of the route to be the aggregate address. Enter the IP address in dotted decimal format (A.B.C.D) and mask in /prefix format (/x).
advertise-map *map-name*	(OPTIONAL) Enter the keywords `advertise-map` then the name of a configured route map to set filters for advertising an aggregate route.

as-set	(OPTIONAL) Enter the keyword `as-set` to generate path attribute information and include it in the aggregate. AS_SET includes AS_PATH and community information from the routes included in the aggregated route.
attribute-map *map-name*	(OPTIONAL) Enter the keywords `attribute-map` then the name of a configured route map to modify attributes of the aggregate, excluding AS_PATH and NEXT_HOP attributes.
summary-only	(OPTIONAL) Enter the keyword `summary-only` to advertise only the aggregate address. Specific routes are not advertised.
suppress-map *map-name*	(OPTIONAL) Enter the keywords `suppress-map` then the name of a configured route map to identify which more-specific routes in the aggregate are suppressed.

Defaults

Not configured.

Command Modes

- ROUTER BGP ADDRESS FAMILY
- ROUTER BGP ADDRESS FAMILY IPv6

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

At least one of the routes included in the aggregate address must be in the BGP routing table for the configured aggregate to become active.

If routes within the aggregate are constantly changing, do not add the `as-set` parameter to the aggregate as the aggregate flaps to keep track of the changes in the AS_PATH.

In route maps used in the `suppress-map` parameter, routes meeting the `deny` clause are not suppress; in other words, they are allowed. The opposite is also true: routes meeting the `permit` clause are suppressed.

If the route is injected via the `network` command, that route still appears in the routing table if the `summary-only` parameter is configured in the `aggregate-address` command.

The `summary-only` parameter suppresses all advertisements. If you want to suppress advertisements to only specific neighbors, use the `neighbor distribute-list` command.

In the `show ip bgp` command, aggregates contain an 'a' in the first column and routes suppressed by the aggregate contain an 's' in the first column.

When an aggregate address is denied using a peer's outbound route-map, individual routes suppressed by the aggregate address are advertised to that peer.

The attribute-map corresponding to an aggregate address is applied during the outbound update creation time; hence the value set in that attribute-map will not be shown in the output of the `show ip bgp aggregate route` command.

bgp add-path

Allow the advertisement of multiple paths for the same address prefix without the new paths replacing any previous ones.

S6000

Syntax

```
bgp add-path [send | receive | both] path-count
```

Parameters

send	Enter the keyword `send` to indicate that the system sends multiple paths to peers.
receive	Enter the keyword `receive` to indicate that the system accepts multiple paths from peers.
both	Enter the keyword `both` to indicate that the system sends and accepts multiple paths from peers.
path-count	Enter the number paths supported. The range is from 2 to 64.

Defaults

Disabled

Command Modes

- ROUTER BGP
- ROUTER BGP-address-family

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.0	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Related Commands

neighbor add-path — specifies that this neighbor/peer group can send/receive multiple path advertisements.

bgp always-compare-med

Allows you to enable comparison of the MULTI_EXIT_DISC (MED) attributes in the paths from different external ASs.

S6000

Syntax

`bgp always-compare-med`

To disable comparison of MED, enter `no bgp always-compare-med`.

Defaults

Disabled (that is, the software only compares MEDs from neighbors within the same AS).

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced command.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Any update without a MED attribute is the least preferred route.

If you enable this command, use the `clear ip bgp *` command to recompute the best path.

bgp asnotation

Allows you to implement a method for AS number representation in the command line interface (CLI).

S6000

Syntax	`bgp asnotation [asplain | asdot+ | asdot]` To disable a dot or dot+ representation and return to ASPLAIN, enter the `no bgp asnotation` command.
Defaults	**asplain**
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced the dynamic application of AS notation changes
Version 8.2.1.0	Introduced

Usage Information

Before enabling this feature, enable the `enable bgp four-octet-as-support`command. If you disable the `four-octect-support` command after using dot or dot+ format, the AS numbers revert to asplain text.

When you apply an asnotation, it is reflected in the running-configuration. If you change the notation type, the running-config updates dynamically and the new notation shows.

Example

```
Dell(conf)#router bgp 1
Dell(conf-router_bgp)#bgp asnotation asdot
Dell(conf-router_bgp)#ex
Dell(conf)#do show run | grep bgp

router bgp 1
  bgp four-octet-as-support
  bgp asnotation asdot

Dell(conf)#router bgp 1
Dell(conf-router_bgp)#bgp asnotation asdot+
Dell(conf-router_bgp)#ex

Dell(conf)#do show run | grep bgp
```

```
router bgp 1
  bgp four-octet-as-support
  bgp asnotation asdot+

Dell(conf)#router bgp 1
Dell(conf-router_bgp)#bgp asnotation asplain
Dell(conf-router_bgp)#ex
Dell(conf)#do show run |grep bgp
router bgp 1
  bgp four-octet-as-support

Dell(conf)#
```

Related Commands	bgp four-octet-as-support — enables 4-byte support for the BGP process.

bgp bestpath as-path ignore

Ignore the AS PATH in BGP best path calculations.

S6000

Syntax

`bgp bestpath as-path ignore`

To return to the default, enter the `no bgp bestpath as-path ignore` command.

Defaults

Disabled (that is, the software considers the AS_PATH when choosing a route as best).

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

If you enable this command, use the `clear ip bgp *` command to recompute the best path.

bgp bestpath as-path multipath-relax

Include prefixes received from different AS paths during multipath calculation.

S6000

Syntax

`bgp bestpath as-path multipath-relax`

To return to the default BGP routing process, use the `no bgp bestpath as-path multipath-relax` command.

Defaults

Disabled

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.4	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

The `bestpath router bgp configuration mode` command changes the default bestpath selection algorithm. The `multipath-relax` option allows load-sharing across providers with different (but equal-length) autonomous system paths. Without this option, ECMP expects the AS paths to be identical for load-sharing.

bgp bestpath med confed

Enable MULTI_EXIT_DISC (MED) attribute comparison on paths learned from BGP confederations.

S6000

Syntax

`bgp bestpath med confed`

To disable MED comparison on BGP confederation paths, enter the `no bgp bestpath med confed` command.

Defaults

Disabled

Command Modes

ROUTER BGP

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information	The software compares the MEDs only if the path contains no external autonomous system numbers. If you enable this command, use the `clear ip bgp *` command to recompute the best path.

bgp bestpath med missing-as-best

During path selection, indicate preference to paths with missing MED (MULTI_EXIT_DISC) over paths with an advertised MED attribute.

S6000

Syntax	`bgp bestpath med missing-as-best` To return to the default selection, use the `no bgp bestpath med missing-as-best` command.
Defaults	Disabled
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Version 7.7.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced

Usage Information The MED is a 4-byte unsigned integer value and the default behavior is to assume a missing MED as 4294967295. This command causes a missing MED to be treated as 0. During path selection, paths with a lower MED are preferred over paths with a higher MED.

bgp bestpath router-id ignore

Do not compare router-id information for external paths during best path selection.

S6000

Syntax `bgp bestpath router-id ignore`

To return to the default selection, use the `no bgp bestpath router-id ignore` command.

Defaults Disabled

Command Modes ROUTER BGP

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced

Usage Information Configuring this option retains the current best-path. When sessions are then reset, the oldest received path is chosen as the best-path.

bgp client-to-client reflection

Allows you to enable route reflection between clients in a cluster.

S6000

Syntax `bgp client-to-client reflection`

To disable client-to-client reflection, use the `no bgp client-to-client reflection` command.

Defaults

Enabled when a route reflector is configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Route reflection to clients is not necessary if all client routers are fully meshed.

Related Commands

bgp cluster-id — assigns an ID to a BGP cluster with two or more route reflectors.

neighbor route-reflector-client — configures a route reflector and clients.

bgp cluster-id

Assign a cluster ID to a BGP cluster with more than one route reflector.

S6000

Syntax

`bgp cluster-id {ip-address | number}`

To delete a cluster ID, use the `no bgp cluster-id {ip-address | number}` command.

Parameters

ip-address	Enter an IP address as the route reflector cluster ID.
number	Enter a route reflector cluster ID as a number from 1 to 4294967295.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

When a BGP cluster contains only one route reflector, the cluster ID is the route reflector's router ID. For redundancy, a BGP cluster may contain two or more route reflectors. Assign a cluster ID with the `bgp cluster-id` command. Without a cluster ID, the route reflector cannot recognize route updates from the other route reflectors within the cluster.

The default format for displaying the cluster-id is dotted decimal, but if you enter the cluster-id as an integer, it is displayed as an integer.

This command automatically restarts the BGP instance for the configuration to take effect.

Related Commands

bgp client-to-client reflection — enables route reflection between the route reflector and clients.

neighbor route-reflector-client — configures a route reflector and clients.

show ip bgp cluster-list — views paths with a cluster ID.

bgp confederation identifier

Configure an identifier for a BGP confederation.

S6000

Syntax

`bgp confederation identifier` *`as-number`*

To delete a BGP confederation identifier, use the `no bgp confederation identifier as-number` command.

Parameters

as-number	Enter the AS number. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series. Added support for the 4-byte format

Usage Information

To accept 4-byte formats before entering a 4-byte AS number, configure your system. All the routers in the Confederation must be 4 byte or 2 byte identified routers. You cannot mix them.

The autonomous systems configured in this command are visible to the EBGP neighbors. Each autonomous system is fully meshed and contains a few connections to other autonomous systems. The next hop, MED, and local preference information is preserved throughout the confederation.

Dell Networking OS accepts confederation EBGP peers without a LOCAL_PREF attribute. The software sends AS_CONFED_SET and accepts AS_CONFED_SET and AS_CONF_SEQ.

If a local-as is configured, BGP does not allow for the configuration of BGP confederation. Similarly, if BGP confederation is configured, then BGP does not allow the configuration of local-as.

If the neighbor is an eBGP neighbor, then BGP performs a check on the first AS number. In this scenario, it is mandatory that the first sequence in the AS path is of type AS_SEQUENCE or AS_CONFED_SEQUENCE (in the case of confederations). If the first entry appears as an AS_CONFED_SET and the neighbor is not in the local AS, then this is strictly a problem with the neighbor node.

This command automatically restarts the BGP instance for the configuration to take effect.

Related Commands

bgp four-octet-as-support — enables 4-byte support for the BGP process.

bgp confederation peers

Specify the autonomous systems (ASs) that belong to the BGP confederation.

S6000

Syntax

`bgp confederation peers as-number [...as-number]`

To return to the default, use the `no bgp confederation peers` command.

Parameters

as-number	Enter the AS number. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).
...as-number	(OPTIONAL) Enter up to 16 confederation numbers. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series. Added support for the 4-byte format.

Usage Information

All the routers in the Confederation must be 4 byte or 2 byte identified routers. You cannot mix them.

The autonomous systems configured in this command are visible to the EBGP neighbors. Each autonomous system is fully meshed and contains a few connections to other autonomous systems.

After specifying autonomous systems numbers for the BGP confederation, recycle the peers to update their configuration.

Related Commands	bgp confederation identifier — configures a confederation ID. bgp four-octet-as-support — enables 4-byte support for the BGP process.

bgp dampening

Enable BGP route dampening and configure the dampening parameters.

S6000

Syntax

```
bgp dampening [half-life reuse suppress max-suppress-time]
[route-map map-name]
```

To disable route dampening, use the `no bgp dampening [half-life reuse suppress max-suppress-time] [route-map map-name]` command.

Parameters

half-life	(OPTIONAL) Enter the number of minutes after which the Penalty is decreased. After the router assigns a Penalty of 1024 to a route, the Penalty is decreased by half after the half-life period expires. The range is from 1 to 45. The default is **15 minutes**.
reuse	(OPTIONAL) Enter a number as the reuse value, which is compared to the flapping route's Penalty value. If the Penalty value is less than the reuse value, the flapping route is once again advertised (or no longer suppressed). The range is from 1 to 20000. The default is **750**.
suppress	(OPTIONAL) Enter a number as the suppress value, which is compared to the flapping route's Penalty value. If the Penalty value is greater than the suppress value, the flapping route is no longer advertised (that is, it is suppressed). The range is from 1 to 20000. The default is **2000**.
max-suppress-time	(OPTIONAL) Enter the maximum number of minutes a route can be suppressed. The default is four times the half-life value. The range is from 1 to 255. The default is **60 minutes**.
route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of a configured route map. Only `match` commands in the configured route map are supported.

Defaults

Disabled.

Command Modes

- ROUTER BGP
- ROUTER BGP-address-family

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

If you enter the `bgp dampening` command, the default values for *`half-life`*, *`reuse`*, *`suppress`*, and *`max-suppress-time`* are applied. The parameters are position-dependent; therefore, if you configure one parameter, configure the parameters in the order they appear in the CLI.

Route refresh is sent when you enable BGP dampening.

Related Commands

show ip bgp dampened-paths — views the BGP paths.

bgp default local-preference

Change the default local preference value for routes exchanged between internal BGP peers.

S6000

Syntax

`bgp default local-preference` *`value`*

To return to the default value, use the `no bgp default local-preference` command.

Parameters

value	Enter a number to assign to routes as the degree of preference for those routes. When routes are compared, the higher the degree of preference or local preference value, the more the route is preferred. The range is from 0 to 4294967295. The default is **100**.

Defaults

100

Command Modes

ROUTER BGP

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information	All routers apply the `bgp default local-preference` command setting within the AS. To set the local preference for a specific route, use the `set local-preference` command in ROUTE-MAP mode.
Related Commands	set local-preference — assigns a local preference value for a specific route.

bgp enforce-first-as

Disable (or enable) enforce-first-as check for updates received from EBGP peers.

S6000

Syntax	`bgp enforce-first-as` To turn off the default, use the `no bgp enforce-first-as` command.
Defaults	Enabled
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

Usage Information

This command is enabled by default, that is for all updates received from EBGP peers, BGP ensures that the first AS of the first AS segment is always the AS of the peer. If not, the update is dropped and a counter is increments. Use the `show ip bgp neighbors` command to view the "failed enforce-first-as check" counter.

If you disable the `enforce-first-as` command, it can be viewed using the `show ip protocols` command.

In the event of an enfore-first-as check failure, the existing BGP session is flapped.

Related Commands

show ip bgp neighbors — views the information the BGP neighbors exchange.

show ip protocols — views information on routing protocols.

bgp fast-external-fallover

Enable the fast external fallover feature, which immediately resets the BGP session if a link to a directly connected external peer fails.

S6000

Syntax

`bgp fast-external-fallover`

To disable fast external fallover, use the `no bgp fast-external-fallover` command.

Defaults

Enabled

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The `bgp fast-external-fallover` command appears in the `show config` command output.

The fast external fallover configuration is applied only after you manually reset all the existing BGP sessions. As a result, after you execute this command, you must also manually execute the `clear ip bgp` command in order for the configuration to take effect.

bgp four-octet-as-support

Enable 4-byte support for the BGP process.

S6000

Syntax

`bgp four-octet-as-support`

To disable fast external failover, use the `no bgp four-octet-as-support` command.

Defaults

Disabled (supports 2–byte format)

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Routers supporting 4-byte ASNs advertise that function in the OPEN message. The behavior of a 4-byte router is slightly different depending on whether it is speaking to a 2-byte router or a 4-byte router.

When creating Confederations, all the routers in the Confederation must be 4 byte or 2 byte identified routers. You cannot mix them.

Where the 2-byte format is from 1 to 65535, the 4-byte format is from 1 to 4294967295. Both formats are accepted and the advertisements reflect the entered format.

For more information about using the 2 byte or 4-byte format, refer to the *Dell Networking OS Configuration Guide*.

This command automatically restarts the BGP instance for the configuration to take effect.

bgp graceful-restart

To support graceful restart as a receiver only, enable graceful restart on a BGP neighbor, a BGP node, or designate a local router.

S6000

Syntax

```
bgp graceful-restart [restart-time seconds] [stale-path-time
seconds] [role receiver-only]
```

To return to the default, use the `no bgp graceful-restart` command.

Parameters

restart-time *seconds*	Enter the keyword `restart-time` then the maximum number of seconds to restart and bring-up all the peers. The range is from 1 to 3600 seconds. The default is **120 seconds**.
stale-path-time *seconds*	Enter the keyword `stale-path-time` then the maximum number of seconds to wait before restarting a peer's stale paths. The default is **360 seconds**.
role receiver-only	Enter the keyword `role receiver-only` to designate the local router to support graceful restart as a receiver only.

Defaults: as above

Command Modes: ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Version 7.7.1.0	Introduced on the C-Series.

Usage Information

This feature is advertised to BGP neighbors through a capability advertisement. In Receiver Only mode, BGP saves the advertised routes of peers that support this capability when they restart.

BGP graceful restart is active only when the neighbor becomes established. Otherwise it is disabled. Graceful-restart applies to all neighbors with established adjacency.

This command automatically restarts the BGP instance for the configuration to take effect.

bgp non-deterministic-med

Compare MEDs of paths from different autonomous systems.

S6000

Syntax

```
bgp non-deterministic-med
```

To return to the default, use the `no bgp non-deterministic-med` command.

Defaults

Disabled (that is, paths/routes for the same destination but from different ASs do not have their MEDs compared).

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

In Non-Deterministic mode, paths are compared in the order in which they arrive. This method can lead to Dell Networking OS choosing different best paths from a set of paths, depending on the order in which they are received from the neighbors because MED may or may not get compared between adjacent paths. In Deterministic mode (`no bgp non-deterministic-med`), Dell Networking OS compares MED between adjacent paths within an AS group because all paths in the AS group are from the same AS.

When you change the path selection from Deterministic to Non-Deterministic, the path selection for the existing paths remains Deterministic until you enter the `clear ip bgp` command to clear existing paths.

bgp recursive-bgp-next-hop

Enable next-hop resolution through other routes learned by BGP.

S6000

Syntax	`bgp recursive-bgp-next-hop` To disable next-hop resolution, use the `no bgp recursive-bgp-next-hop` command.
Defaults	Enabled
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.2.1.0	Introduced.

Usage Information	This command is a *knob* to disable BGP next-hop resolution using BGP learned routes. During the next-hop resolution, only the first route that the next-hop resolves through is verified for the route's protocol source and is checked if the route is learned from BGP or not. The `clear ip bgp` command is required for this command to take effect and to keep the BGP database consistent. Execute the `clear ip bgp` command right after executing this command.

Related Commands	clear ip bgp — clears the ip bgp.

bgp regex-eval-optz-disable

Disables the Regex Performance engine that optimizes complex regular expression with BGP.

S6000

Syntax

`bgp regex-eval-optz-disable`

To re-enable optimization engine, use the `no bgp regex-eval-optz-disable` command.

Defaults

Enabled

Command Modes

ROUTER BGP (conf-router_bgp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced

Usage Information

BGP uses regular expressions (regex) to filter route information. In particular, the use of regular expressions to filter routes based on AS-PATHs and communities is common. In a large-scale configuration, filtering millions of routes based on regular expressions can be quite CPU intensive, as a regular expression evaluation involves generation and evaluation of complex finite state machines.

BGP policies, containing regular expressions to match as-path and communities, tend to use much CPU processing time, which in turn affects the BGP routing convergence. Additionally, the `show bgp` commands, which are filtered through regular expressions, use up CPU cycles particularly with large databases. The Regex Engine Performance Enhancement feature optimizes the CPU usage by caching and reusing regular expression evaluation results. This caching and reuse may be at the expensive of RP1 processor memory.

Examples	

```
Dell(conf-router_bgp)#no bgp regex-eval-optz-disable
Dell(conf-router_bgp)#do show ip protocols
Routing Protocol is "ospf 22222"
  Router ID is 2.2.2.2
  Area                 Routing for Networks
  51                   10.10.10.0/00

Routing Protocol is "bgp 1"
  Cluster Id is set to 10.10.10.0
  Router Id is set to 10.10.10.0
  Fast-external-fallover enabled
Regular expression evaluation optimization enabled
  Capable of ROUTE_REFRESH
  For Address Family IPv4 Unicast
    BGP table version is 0, main routing table version 0
    Distance: external 20 internal 200 local 200

Dell(conf-router_bgp)#
```

Related Commands	show ip protocols — views information on all routing protocols enabled and active on the E-Series.

bgp router-id

Assign a user-given ID to a BGP router.

S6000

Syntax	`bgp router-id ip-address` To delete a user-assigned IP address, use the `no bgp router-id` command.
Parameters	*ip-address* — Enter an IP address in dotted decimal format to reset only that BGP neighbor.
Defaults	The router ID is the highest IP address of the Loopback interface or, if no Loopback interfaces are configured, the highest IP address of a physical interface on the router.
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Peering sessions are reset when you change the router ID of a BGP router.

This command automatically restarts the BGP instance for the configuration to take effect.

clear ip bgp

Reset BGP sessions. The soft parameter (BGP Soft Reconfiguration) clears the policies without resetting the TCP connection.

S6000

Syntax

```
clear ip bgp [vrf vrf-name] * | as-number | ip-address [flap-
statistics | soft [in | out]]
```

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to clear all BGP sessions corresponding to that VRF. **NOTE:** Use this attribute to clear a BGP instance corresponding to either a specific address family in a default VRF or an IPv4 address family in a a non-default VRF.
*	Enter an asterisk (*) to reset all BGP sessions.
as-number	Enter the AS number to reset all neighbors belonging to that AS. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).
ip-address	Enter an IP address in dotted decimal format to reset all prefixes from that neighbor.
flap-statistics	(OPTIONAL) Enter the keyword `flap-statistics` to reset the flap statistics on all prefixes from that neighbor.
soft	(OPTIONAL) Enter the keyword `soft` to configure and activate policies without resetting the BGP TCP session, that is, BGP Soft Reconfiguration. **NOTE:** If you enter the `clear ip bgp ip-address soft` command, both inbound and outbound policies are reset.
in	(OPTIONAL) Enter the keyword `in` to activate only inbound policies.
out	(OPTIONAL) Enter the keyword `out` to activate only outbound policies.

> **NOTE:** You must execute the `clear ip bgp soft out` command when ever there is a change in the local policy. If you do not run this command after a local policy change, then these policy changes are not reflected in the responses to the peer’s route refresh messages.

<1-4294967295>	Enter <1-4294967295> to clear peers with the AS number.
<0.1-65535.65535>	Enter <0.1-65535.65535> to clear peers with the AS number in dot format.
A.B.C.D	Enter the BGP neighbor address in the A.B.C.D format to clear.
X:X:X:X::X	Enter the BGP neighbor address in the X:X:X:X::X format to clear.
dampening	Enter the keyword `dampening` to clear the flap dampening information.
flap-statistics	Enter the keywords `flap-statistics` to clear the flap statistics information.
ipv4	Enter the ipv4 address family to clear.
ipv6	Enter the ipv6 address family to clear.
peer-group	Enter the peer-group to clear all members of the peer-group.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 6.5.1.0	Expanded to include the `as-number` option.

Related Commands

bgp recursive-bgp-next-hop — disables next-hop resolution through other routes learned by the BGP.

clear ip bgp dampening

Clear information on route dampening and return the suppressed route to the Active state.

S6000

Syntax

`clear ip bgp [vrf vrf-name] dampening [ip-address mask]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to clear information on route dampening corresponding to that VRF NOTE: You can use this attribute on a specific VRF to remove history routes corresponding to that VRF. You can also use this attribute to return the suppressed routes corresponding to a specific VRF to an active state.
ip-address mask	(OPTIONAL) Enter an IP address in dotted decimal format and the prefix mask in slash format (/x) to clear dampening information only that BGP neighbor.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

After you enter this command, the software deletes the history routes and returns the suppressed routes to the Active state.

The `clear ip bgp dampening` command does not clear the history paths.

clear ip bgp flap-statistics

Clear BGP flap statistics, which includes number of flaps and the time of the last flap.

S6000

Syntax

```
clear ip bgp [vrf vrf-name] flap-statistics [ip-address mask |
filter-list as-path-name | regexp regular-expression]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to clear BGP flap statistics corresponding to that VRF. NOTE: You can use this attribute on a specific VRF to remove history routes corresponding to that VRF. You can also use this attribute to return the suppressed routes corresponding to a specific VRF to an active state.
ip-address mask	(OPTIONAL) Enter an IP address in dotted decimal format and the prefix mask in slash format (/x) to reset only that prefix.
filter-list *as-path-name*	(OPTIONAL) Enter the keywords `filter-list` then the name of a configured AS-PATH list.
regexp *regular-expression*	(OPTIONAL) Enter the keyword `regexp` then regular expressions. Use one or a combination of the following: • `.` = (period) any single character (including a white space). • `*` = (asterisk) the sequences in a pattern (0 or more sequences). • `+` = (plus) the sequences in a pattern (1 or more sequences). • `?` = (question mark) sequences in a pattern (either 0 or 1 sequences). NOTE: Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression. • `[ ]` = (brackets) a range of single-character patterns. • `( )` = (parenthesis) groups a series of pattern elements to a single element. • `{ }` = (braces) minimum and the maximum match count. • `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified. • `$` = (dollar sign) the end of the output string.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

If you enter the `clear ip bgp flap-statistics` command without any parameters, all statistics are cleared.

Related Commands

show debugging — views the enabled debugging operations.

show ip bgp flap-statistics — views the BGP flap statistics.

undebug all — disables all debugging operations.

clear ip bgp peer-group

Reset a peer-group's BGP sessions.

S6000

Syntax

```
clear ip bgp [vrf vrf-name] peer-group peer-group-name
```

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to reset the peer group corresponding to that VRF. NOTE: You can use this attribute on a specific VRF to remove history routes corresponding to that VRF. You can also use this attribute to return the suppressed routes corresponding to a specific VRF to an active state.
peer-group-name	Enter the peer group name to reset the BGP sessions within that peer group.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

debug ip bgp

Display all information on BGP, including BGP events, keepalives, notifications, and updates.

S6000

Syntax

```
debug ip bgp [ vrf vrf-name | ip-address | peer-group peer-group-name] [in | out]
```

To disable all BGP debugging, use the `no debug ip bgp` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to debug BGP information corresponding to that VRF. NOTE: Use this attribute to debug BGP protocol operations corresponding to either a default or non-default VRF.
ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group *peer-group-name*	Enter the keywords `peer-group` then the name of the peer group to debug.
in	(OPTIONAL) Enter the keyword `in` to view only information on inbound BGP routes.
out	(OPTIONAL) Enter the keyword `out` to view only information on outbound BGP routes.
A.B.C.D	Enter the IP address of peer in the A.B.C.D format.
X:X:X:X::X	Enter the IPv6 IP address of peer in the X:X:X:X::X format.
dampening	Enter the keyword `dampening` to view BGP dampening.

events	Enter the keyword `events` to view BGP protocol events.
ipv4	Enter the ipv4 IP address to view the IPV4 route information.
ipv6	Enter the ipv6 IP address to view the IPV6 route information.
keepalives	Enter the keyword `keepalives` to view BGP keepalives.
notifications	Enter the keyword `notifications` to view BGP notifications.
soft-reconfiguration	Enter the keywords `soft-reconfiguration` to view only information on inbound BGP soft reconfiguration.
updates	Enter the keyword `updates` to view BGP updates.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To view information on both incoming and outgoing routes, do not include the `in` and `out` parameters in the debugging command. The `in` and `out` parameters cancel each other; for example, if you enter the `debug ip bgp in` command and then enter the `debug ip bgp out` command, you do not see information on the incoming routes.

Entering a `no debug ip bgp` command removes all configured debug commands for BGP.

Related Commands

debug ip bgp events — views information about BGP events.

debug ip bgp keepalives — views information about BGP keepalives.

debug ip bgp notifications — views information about BGP notifications.

debug ip bgp updates — views information about BGP updates.

show debugging — views enabled debugging operations.

debug ip bgp dampening

View information on routes being dampened.

S6000

Syntax	`debug ip bgp [vrf test	ipv4 {unicast	multicast}	ipv6 {unicast	multicast} dampening` To disable debugging, use the `no debug ip bgp ipv4 multicast dampening` command.
Parameters	**dampening** — Enter the keyword `dampening` to debug route flap dampening information.
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced IPv6 MGBP support for the E-Series.

debug ip bgp events

Display information on local BGP state changes and other BGP events.

S6000

Syntax

```
debug ip bgp [ip-address | peer-group peer-group-name] events
[in | out]
```

To disable debugging, use the `no debug ip bgp [ip-address | peer-group peer-group-name] events` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` then the name of the peer group.
in	(OPTIONAL) Enter the keyword `in` to view only events on inbound BGP messages.
out	(OPTIONAL) Enter the keyword `out` to view only events on outbound BGP messages.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

debug ip bgp keepalives

Display information about BGP keepalive messages.

S6000

Syntax

`debug ip bgp [`*`ip-address`*` | peer-group `*`peer-group-name`*`] keepalives [in | out]`

To disable debugging, use the `no debug ip bgp [ip-address | peer-group `*`peer-group-name`*`] keepalives [in | out]` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.

peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` then the name of the peer group.
in	(OPTIONAL) Enter the keyword `in` to view only inbound keepalive messages.
out	(OPTIONAL) Enter the keyword `out` to view only outbound keepalive messages.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

debug ip bgp notifications

Allows you to view information about BGP notifications received from neighbors.

S6000

Syntax

```
debug ip bgp [ip-address | peer-group peer-group-name]
notifications [in | out]
```

To disable debugging, use the `no debug ip bgp [ip-address | peer-group peer-group-name] notifications [in | out]` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group *peer-group-name*	(OPTIONAL) Enter the keyword `peer-group` then the name of the peer group.

in	(OPTIONAL) Enter the keyword `in` to view BGP notifications received from neighbors.
out	(OPTIONAL) Enter the keyword `out` to view BGP notifications sent to neighbors

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

debug ip bgp soft-reconfiguration

Enable soft-reconfiguration debug.

S6000

Syntax `debug ip bgp {ip-address | peer-group-name} soft-reconfiguration`

To disable, use the `no debug ip bgp {ip-address | peer-group-name} soft-reconfiguration` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	(OPTIONAL) Enter the name of the peer group to disable or enable all routers within the peer group..

Defaults Disabled

Command Modes EXEC Privilege

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.2.1.0	Introduced.

Usage Information	This command turns on BGP soft-reconfiguration inbound debugging. If no neighbor is specified, debug turns on for all neighbors.

debug ip bgp updates

Allows you to view information about BGP updates.

S6000

Syntax	`debug ip bgp updates [in | out | prefix-list prefix-list-name]` To disable debugging, use the `no debug ip bgp [`*`ip-address`*` | peer-group `*`peer-group-name`*`] updates [in | out]` command.

Parameters

in	(OPTIONAL) Enter the keyword `in` to view only BGP updates received from neighbors.
out	(OPTIONAL) Enter the keyword `out` to view only BGP updates sent to neighbors.
prefix-list *prefix-list-name*	(OPTIONAL) Enter the keyword `prefix-list` then the name of an established prefix list. If the prefix list is not configured, the default is **permit** (to allow all routes).
ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	(OPTIONAL) Enter the name of the peer group to disable or enable all routers within the peer group.

Command Modes	EXEC Privilege

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information	To remove all configured debug commands for BGP, enter the `no debug ip bgp` command.

default-metric

Allows you to change the metric of redistributed routes to locally originated routes. Use this command with the `redistribute` command.

S6000

Syntax	`default-metric` *`number`* To return to the default setting, use the `no default-metric` command.
Parameters	*number*: Enter a number as the metric to be assigned to routes from other protocols. The range is from 1 to 4294967295.
Defaults	**0**
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The `default-metric` command in BGP sets the value of the BGP MULTI_EXIT_DISC (MED) attribute for redistributed routes only.

Related Commands

bgp always-compare-med — enables comparison of all BGP MED attributes.

redistribute — redistributes routes from other routing protocols into BGP.

description

Enter a description of the BGP routing protocol

S6000

Syntax

`description {`*`description`*`}`

To remove the description, use the `no description {`*`description`*`}` command.

Parameters

description	Enter a description to identify the BGP protocol (80 characters maximum).

Defaults

none

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
pre-7.7.1.0	Introduced.

Related Commands

router bgp — enters ROUTER mode on the switch.

max-paths

Configure the maximum number of parallel routes (multipath support) BGP supports.

S6000

Syntax	`max-paths {ebgp | ibgp} number` To return to the default values, enter the `no maximum-paths` command.

Parameters

ebgp	Enter the keyword `ebgp` to enable multipath support for External BGP routes.
ibgp	Enter the keyword `ibgp` to enable multipath support for Internal BGP routes.
number	Enter a number as the maximum number of parallel paths.

Defaults	none
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Support from 2 to 64 paths on the S4810. Command syntax changed to `max-path` (was maximum-paths).
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information	If you enable this command, use the `clear ip bgp *` command to recompute the best path.

neighbor activate

This command allows the specified neighbor/peer group to be enabled for the current AFI/SAFI (Address Family Identifier/Subsequent Address Family Identifier).

S6000

Syntax	`neighbor [ip-address | peer-group-name] activate` To disable, use the `no neighbor [ip-address | peer-group-name] activate` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	(OPTIONAL) Enter the name of the peer group.
activate	Enter the keyword `activate` to enable the neighbor/peer group in the new AFI/SAFI.

Defaults	Disabled
Command Modes	CONFIGURATION-ROUTER-BGP-ADDRESS FAMILY
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information	By default, when you create a neighbor/peer group configuration in the Router BGP context, this enables IPv4/Unicast AFI/SAFI. When you use `activate` in the new context, the neighbor/peer group enables for AFI/SAFI. It is not possible to de-activate a peer from the IPv4 unicast address family.

neighbor add-path

This command allows the specified neighbor/peer group to send/receive multiple path advertisements.

S6000

Syntax

```
neighbor [ip-address | peer-group-name] add-path [send |
receive | both] path-count
```

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	(OPTIONAL) Enter the name of the peer group.
send	Enter the keyword `send` to indicate that the system sends multiple paths to peers.
receive	Enter the keyword `receive` to indicate that the system accepts multiple paths from peers.
both	Enter the keyword `both` to indicate that the system sends and accepts multiple paths from peers.
path-count	Enter the number paths supported. The range is from 2 to 64.

Defaults

none

Command Modes

CONFIGURATION-ROUTER-BGP-ADDRESS FAMILY

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Related Commands

bgp add-path — allows the advertisement of multiple paths for the same address prefix without the new paths implicitly replacing any previous ones.

neighbor advertisement-interval

Set the advertisement interval between BGP neighbors or within a BGP peer group.

S6000

Syntax	`neighbor {ip-address | peer-group-name} advertisement-interval seconds` To return to the default value, use the `no neighbor {ip-address | peer-group-name} advertisement-interval` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the advertisement interval for all routers in the peer group.
seconds	Enter a number as the time interval, in seconds, between BGP advertisements. The range is from 0 to 600 seconds. The default is **5 seconds** for internal BGP peers and **30 seconds** for external BGP peers.

Defaults

- seconds = **5 seconds** (internal peers)
- seconds = **30 seconds** (external peers)

Command Modes: ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

neighbor advertisement-start

To send BGP routing updates, set the minimum interval before starting.

S6000

Syntax

```
neighbor {ip-address} advertisement-start seconds
```

To return to the default value, use the `no neighbor {ip-address} advertisement-start` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
seconds	Enter a number as the time interval, in seconds, before BGP route updates are sent. The range is from 0 to 3600 seconds.

Defaults none

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

neighbor allowas-in

Set the number of times an AS number can occur in the AS path.

S6000

Syntax

```
neighbor {ip-address | peer-group-name} allowas-in number
```

To return to the default value, use the `no neighbor {ip-address | peer-group-name} allowas-in` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.

peer-group-name	Enter the name of the peer group to set the advertisement interval for all routers in the peer group.
number	Enter a number of times to allow this neighbor ID to use the AS path. The range is from 1 to 10.

Defaults: Not configured.

Command Modes: ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

You cannot set this configuration for a peer that is associated with a peer group. Similarly, you cannot associate a peer to a peer group if that peer is already configured with these settings.

Related Commands

bgp four-octet-as-support — enables 4-byte support for the BGP process.

neighbor default-originate

Inject the default route to a BGP peer or neighbor.

S6000

Syntax

```
neighbor {ip-address | peer-group-name} default-originate
[route-map map-name]
```

To remove a default route, use the `no neighbor {ip-address | peer-group-name} default-originate` command.

Parameters

ip-address	(OPTIONAL) Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the default route of all routers in that peer group.

route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of a configured route map.

Defaults Not configured.

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

If you apply a route map to a BGP peer or neighbor with the `neighbor default-originate` command configured, the software does not apply the set filters in the route map to that BGP peer or neighbor.

When you configure a route-map for a BGP peer or peer group with the `neighbor default-originate` command, the command checks for the existence of the route in BGP RIB.

Route-map configuration on a BGP peer or peer group works only when the LOC-RIB contains at least one route.

When you apply a default route to a BGP peer or peer group using the `neighbor default-originate` command, changes to the configured default route-map are applied to the BGP peer or peer group only after a delay of 15 seconds. As a result, you must wait for a period of 15 seconds before manually resetting BGP using the `clear ip bgp` command.

In case of eBGP, the `neighbor default-originate` command does not support *extended-community* as a non-transtive route-map attribute.

You cannot set this configuration for a peer that is associated with a peer group. Similarly, you cannot associate a peer to a peer group if that peer is already configured with these settings.

In order that settings corresponding to the `neighbor default-originate` command take effect, you must execute the `clear ip bgp` command immediately after you execute the `neighbor default-originate` command.

neighbor description

Assign a character string describing the neighbor or group of neighbors (peer group).

S6000

Syntax

`neighbor {ip-address | peer-group-name} description text`

To delete a description, use the `no neighbor {ip-address | peer-group-name} description` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.
text	Enter a continuous text string up to 80 characters.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

neighbor distribute-list

Distribute BGP information via an established prefix list.

S6000

Syntax

`neighbor {ip-address | peer-group-name} distribute-list prefix-list-name {in | out}`

To delete a neighbor distribution list, use the `no neighbor {ip-address | peer-group-name} distribute-list prefix-list-name {in | out}` command.

Parameters	*ip-address*	Enter the IP address of the neighbor in dotted decimal format.
	peer-group-name	Enter the name of the peer group to apply the distribute list filter to all routers in the peer group.
	prefix-list-name	Enter the name of an established prefix list. If the prefix list is not configured, the default is **permit** (to allow all routes).
	in	Enter the keyword `in` to distribute only inbound traffic.
	out	Enter the keyword `out` to distribute only outbound traffic.

Defaults Not configured.

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Other BGP filtering commands include: `neighbor filter-list`, `ip as-path access-list`, and `neighbor route-map`.

Related Commands

neighbor route-map — assigns a route map to a neighbor or peer group.

neighbor ebgp-multihop

Attempt and accept BGP connections to external peers on networks that are not directly connected.

S6000

Syntax

```
neighbor {ip-address | peer-group-name} ebgp-multihop [ttl]
```

To disallow and disconnect connections, use the `no neighbor {ip-address | peer-group-name} ebgp-multihop` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.
ttl	(OPTIONAL) Enter the number of hops as the Time to Live (ttl) value. The range is from 1 to 255. The default is **255**.

Defaults

Disabled.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To prevent loops, the `neighbor ebgp-multihop` command does not install the default routes of the multihop peer. Networks not directly connected are not considered valid for best-path selection.

neighbor fall-over

Enable or disable fast fall-over for BGP neighbors.

S6000

Syntax

`neighbor {ipv4-address | peer-group-name} fall-over`

To disable, use the `no neighbor {ipv4-address | peer-group-name} fall-over` command.

Parameters

ipv4-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.

Defaults	Disabled.
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced

Usage Information	When you enable failover, BGP keeps track of IP or IPv6 ability to reach the peer remote address and the peer local address. Whenever either address becomes unreachable (for example, no active route exists in the routing table for the peer IP or IPv6 destination/local address), BGP brings down the session with the peer.
Related Commands	show ip bgp neighbors — displays information on the BGP neighbors.

neighbor local-as

To accept external routes from neighbors with a local AS number in the AS number path, configure Internal BGP (IBGP) routers.

S6000

Syntax

`neighbor {ip-address | peer-group-name} local-as as-number [no-prepend]`

To return to the default value, use the `no neighbor {ip-address | peer-group-name} local-as` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the advertisement interval for all routers in the peer group.
as-number	Enter the AS number to reset all neighbors belonging to that AS. The range is from 0 to 65535 (2 byte), from 1 to 4294967295 (4 byte) or from 0.1 to 65535.65535 (dotted format).

no prepend	Specifies that local AS values do not prepend to announcements from the neighbor.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

If a local-as is configured, BGP does not allow for the configuration of BGP confederation. Similarly, if BGP confederation is configured, then BGP does not allow the configuration of local-as.

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands

bgp four-octet-as-support — enables 4-byte support for the BGP process.

neighbor maximum-prefix

Control the number of network prefixes received.

S6000

Syntax

`neighbor {ip-address | peer-group-name} maximum-prefix maximum [threshold] [warning-only]`

To return to the default values, use the `no neighbor {ip-address | peer-group-name} maximum-prefix maximum` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.

maximum	Enter a number as the maximum number of prefixes allowed for this BGP router. The range is from 1 to 4294967295.
threshold	(OPTIONAL) Enter a number to be used as a percentage of the maximum value. When the number of prefixes reaches this percentage of the maximum value, the E-Series software sends a message. The range is from 1 to 100 percent. The default is **75**.
warning-only	(OPTIONAL) Enter the keyword `warning-only` to set the router to send a log message when the maximum value is reached. If this parameter is not set, the router stops peering when the maximum number of prefixes is reached. NOTE: When you set this option, the router accepts BGP prefixes only until the maximum configured value. After the maximum number is reached, the router drops any additional prefixes that it receives.

Defaults

threshold = **75**

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

If you configure the `neighbor maximum-prefix` command and the neighbor receives more prefixes than the `neighbor maximum-prefix` command configuration allows, the neighbor goes down and the `show ip bgp summary` command displays (prfxd) in the State/PfxRcd column for that neighbor. The neighbor remains down until you enter the `clear ip bgp` command for the neighbor or the peer group to which the neighbor belongs or you enter the `neighbor shutdown` and `neighbor no shutdown` commands.

Related Commands

show ip bgp summary — displays the current BGP configuration.

neighbor password

Enable message digest 5 (MD5) authentication on the TCP connection between two neighbors.

S6000

Syntax	`neighbor {ip-address | peer-group-name} password [encryption-type] password` To delete a password, use the `no neighbor {ip-address | peer-group-name} password` command.

Parameters

ip-address	Enter the IP address of the router to be included in the peer group.
peer-group-name	Enter the name of a configured peer group.
encryption-type	(OPTIONAL) Enter `7` as the encryption type for the password entered. `7` means that the password is encrypted and hidden.
password	Enter a text string up to 80 characters long. The first character of the password must be a letter. You cannot use spaces in the password.

Defaults	Not configured.
Command Modes	ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

This command automatically restarts the neighbor session for the configuration to take effect.

Configure the same password on both BGP peers or a connection does not occur. When you configure MD5 authentication between two BGP peers, each segment of the TCP connection between them is verified and the MD5 digest is checked on every segment sent on the TCP connection.

Configuring a password for a neighbor causes an existing session to be torn down and a new one established.

If you specify a BGP peer group by using the `peer-group-name` parameter, all the members of the peer group inherit the characteristic configured with this command.

If you configure a password on one neighbor, but you have not configured a password for the neighboring router, the following message appears on the console while the routers attempt to establish a BGP session between them:

```
%RPM0-P:RP1 %KERN-6-INT: No BGP MD5 from [peer's IP address]
:179 to [local router's IP address]:65524
```

Also, if you configure different passwords on the two routers, the following message appears on the console:

```
%RPM0-P:RP1 %KERN-6-INT: BGP MD5 password mismatch from
[peer's IP address] : 11502 to [local router's IP address] :179
```

neighbor peer-group (assigning peers)

Allows you to assign one peer to an existing peer group.

S6000

Syntax

`neighbor ip-address peer-group peer-group-name`

To delete a peer from a peer group, use the `no neighbor ip-address peer-group peer-group-name` command.

Parameters

ip-address	Enter the IP address of the router to be included in the peer group.
peer-group-name	Enter the name of a configured peer group.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

You can assign up to 256 peers to one peer group.

When you add a peer to a peer group, it inherits all the peer group's configured parameters. A peer cannot become part of a peer group if any of the following commands are configured on the peer:

- neighbor advertisement-interval
- neighbor distribute-list
- neighbor route-map
- neighbor route-reflector-client

A neighbor may keep its configuration after it was added to a peer group if the neighbor's configuration is more specific than the peer group's, and the neighbor's configuration does not affect outgoing updates.

A peer group must exist before you add a peer to it. If the peer group is disabled (shutdown) the peers within the group are also disabled (shutdown).

In BGP, you cannot associate a peer to a peer-group without configuring the remote-as for Internal BGP (IBGP) or External BGP (EBGP).

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands

clear ip bgp — resets BGP sessions.

neighbor peer-group (creating group) — creates a peer group.

show ip bgp peer-group — views BGP peers.

show ip bgp neighbors — views BGP neighbors configurations.

neighbor peer-group (creating group)

Allows you to create a peer group and assign it a name.

S6000

Syntax

`neighbor peer-group-name peer-group`

To delete a peer group, use the `no neighbor peer-group-name peer-group` command.

Parameters	*peer-group-name*	Enter a text string up to 16 characters long as the name of the peer group.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

When you create a peer group, it is disabled (Shut mode).

Related Commands

neighbor peer-group (assigning peers) — assigns routers to a peer group.

neighbor remote-as — assigns a indirectly connected AS to a neighbor or peer group.

neighbor shutdown — disables a peer or peer group.

neighbor peer-group passive

Enable passive peering on a BGP peer group, that is, the peer group does not send an OPEN message, but responds to one.

S6000

Syntax

`neighbor peer-group-name peer-group passive [sessions]`

To delete a passive peer-group, use the `no neighbor peer-group-name peer-group passive` command.

Parameters	*peer-group-name*	Enter a text string up to 16 characters long as the name of the peer group.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced the `limit` keyword on the S4810.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

After you configure a peer group as passive, assign it a subnet using the `neighbor soft-reconfiguration inbound` command.

For passive eBGP limits, the Remote AS must be different from the AS for this neighbor.

Related Commands

neighbor soft-reconfiguration inbound — assigns a subnet to a dynamically configured BGP neighbor.

neighbor remote-as — assigns an indirectly connected AS to a neighbor or peer group.

neighbor remote-as

Create and specify the remote peer to the BGP neighbor.

S6000

Syntax

`neighbor {ip-address | peer-group-name} remote-as number`

To delete a remote AS entry, use the `no neighbor {ip-address | peer-group-name} remote-as number` command.

Parameters

ip-address	Enter the IP address of the neighbor to enter the remote AS in its routing table.

peer-group-name	Enter the name of the peer group to enter the remote AS into routing tables of all routers within the peer group.
number	Enter a number of the AS. The range is from 0 to 65535 (2 byte) or from 1 to 4294967295 (4 byte).

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series. Added 4-byte support.

Usage Information

To accept 4-byte formats before entering a 4 byte AS Number, configure your system. If the `number` parameter is the same as the AS number used in the `router bgp` command, the remote AS entry in the neighbor is considered an internal BGP peer entry.

This command creates a peer and the newly created peer is disabled (Shutdown).

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands

router bgp — enters ROUTER BGP mode and configures routes in an AS.

bgp four-octet-as-support — enables 4-byte support for the BGP process.

neighbor remove-private-as

Remove private AS numbers from the AS-PATH of outgoing updates.

S6000

Syntax

`neighbor {ip-address | peer-group-name} remove-private-as`

To return to the default, use the `no neighbor {ip-address | peer-group-name} remove-private-as` command.

Parameters

ip-address	Enter the IP address of the neighbor to remove the private AS numbers.
peer-group-name	Enter the name of the peer group to remove the private AS numbers.

Defaults Disabled (that is, private AS number are not removed).

Command Modes ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series. Added 4-byte support.

Usage Information

Applies to EBGP neighbors only.

Configure your system to accept 4-byte formats before entering a 4 byte AS Number.

If the AS-PATH contains both public and private AS number or contains AS numbers of an EBGP neighbor, the private AS numbers are not removed.

If a confederation contains private AS numbers in its AS-PATH, the software removes the private AS numbers only if they follow the confederation numbers in the AS path.

Private AS numbers are from 64512 to 65535 (2 byte).

neighbor route-map

Apply an established route map to either incoming or outbound routes of a BGP neighbor or peer group.

S6000

Syntax

```
neighbor {ip-address | peer-group-name} route-map map-name {in
| out}
```

To remove the route map, use the `no neighbor {`*`ip-address`*` | `*`peer-group-name`*`} route-map `*`map-name`*` {in | out}` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group.
map-name	Enter the name of an established route map. If the Route map is not configured, the default is **deny** (to drop all routes).
in	Enter the keyword `in` to filter inbound routes.
out	Enter the keyword `out` to filter outbound routes. NOTE: This command sends routes to peers only if an outbound policy is configured and if there is a change in the existing outbound policy.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

When you apply a route map to outbound routes, only routes that match at least one section of the route map are permitted.

If you identify a peer group by name, the peers in that peer group inherit the characteristics in the Route map used in this command. If you identify a peer by IP address, the Route map overwrites either the inbound or outbound policies on that peer.

neighbor route-reflector-client

Configure the router as a route reflector and the specified neighbors as members of the cluster.

S6000

Syntax	`neighbor {ip-address | peer-group-name} route-reflector-client` To remove one or more neighbors from a cluster, use the `no neighbor {ip-address | peer-group-name} route-reflector-client` command. If you delete all members of a cluster, you also delete the route-reflector configuration on the router.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group. All routers in the peer group receive routes from a route reflector.

Defaults	Not configured.
Command Modes	ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

A route reflector reflects routes to the neighbors assigned to the cluster. Neighbors in the cluster do not need not to be fully meshed. By default, when you use `no route reflector`, the internal BGP (IBGP) speakers in the network must be fully meshed.

The first time you enter this command, the router configures as a route reflector and the specified BGP neighbors configure as clients in the route-reflector cluster.

When you remove all clients of a route reflector using the `no neighbor route-reflector-client` command, the router no longer functions as a route reflector.

If the clients of a route reflector are fully meshed, you can configure the route reflector to not reflect routes to specified clients by using the `no bgp client-to-client reflection` command.

This command automatically restarts the neighbor session for the configuration to take effect.

Related Commands	bgp client-to-client reflection — enables route reflection between the route reflector and the clients.

neighbor shutdown

Disable a BGP neighbor or peer group.

S6000

Syntax

```
neighbor {ip-address | peer-group-name} shutdown
```

To enable a disabled neighbor or peer group, use the `neighbor {ip-address | peer-group-name}no shutdown` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable or enable all routers within the peer group.

Defaults	Enabled (that is, BGP neighbors and peer groups are disabled.)
Command Modes	ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Peers that are enabled within a peer group are disabled when their peer group is disabled.

The `neighbor shutdown` command terminates all BGP sessions on the BGP neighbor or BGP peer group. Use this command with caution as it terminates the specified BGP sessions. When a neighbor or peer group is shut down, use the `show ip bgp summary` command to confirm its status.

Related Commands

show ip bgp summary — displays the current BGP configuration.

show ip bgp neighbors — displays the current BGP neighbors.

neighbor soft-reconfiguration inbound

Enable soft-reconfiguration for BGP.

S6000

Syntax

```
neighbor {ip-address | peer-group-name} soft-reconfiguration
inbound
```

To disable, use the `no neighbor {ip-address | peer-group-name} soft-reconfiguration inbound` command.

Parameters

ip-address	Enter the IP address of the neighbor in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable or enable all routers within the peer group.

Defaults

Disabled

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Version 7.4.1.0	Introduced.

Usage Information

This command enables soft-reconfiguration for the BGP neighbor specified. BGP stores all the updates the neighbor receives but does not reset the peer-session.

You cannot set this configuration for a peer that is associated with a peer group. Similarly, you cannot associate a peer to a peer group if that peer is already configured with these settings.

⚠ **CAUTION: Inbound update storage is a memory-intensive operation. The entire BGP update database from the neighbor is stored in memory regardless of the inbound policy results applied on the neighbor.**

NOTE: This command is supported in BGP Router Configuration mode for IPv4 Unicast address only.

Related Commands

show ip bgp neighbors — displays routes received by a neighbor.

neighbor timers

Set keepalive and hold time timers for a BGP neighbor or a peer group.

S6000

Syntax

`neighbor {ip-address | peer-group-name} timers keepalive holdtime`

To return to the default values, use the `no neighbor {ip-address | peer-group-name} timers` command.

Parameters

ip-address	Enter the IP address of the peer router in dotted decimal format.
peer-group-name	Enter the name of the peer group to set the timers for all routers within the peer group.
keepalive	Enter a number for the time interval, in seconds, between keepalive messages sent to the neighbor routers. The range is from 1 to 65535. The default is **60 seconds**.
holdtime	Enter a number for the time interval, in seconds, between the last keepalive message and declaring the router dead. The range is from 3 to 65535. The default is **180 seconds**.

Defaults

- keepalive = **60 seconds**
- holdtime = **180 seconds**

Command Modes

ROUTER BGP

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Timer values configured with the `neighbor timers` command override the timer values configured with any other command.

When two neighbors, configured with different `keepalive` and `holdtime` values, negotiate for new values, the resulting values are as follows:

- the lower of the `holdtime` value is the new `holdtime` value, and
- whichever is the lower value; one-third of the new `holdtime` value, or the configured `keepalive` value, is the new keepalive value.

neighbor update-source

Enable the E-Series software to use Loopback interfaces for TCP connections for BGP sessions.

S6000

Syntax

`neighbor {ip-address | peer-group-name} update-source interface`

To use the closest interface, use the `no neighbor {ip-address | peer-group-name} update-source interface` command.

Parameters

ip-address	Enter the IP address of the peer router in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable all routers within the peer group.
interface	Enter the keyword `loopback` then a number of the Loopback interface. The range is from 0 to 16383.

Defaults	Not configured.
Command Modes	ROUTER BGP

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information	Loopback interfaces are up constantly and the BGP session may need one interface constantly up to stabilize the session. The `neighbor update-source` command is not necessary for directly connected internal BGP sessions. Neighbors are sorted according to the source and destination ip addresses. If an update-source ip address exists, then the source ip address determines the order in which the neighbors are displayed.

neighbor weight

Assign a weight to the neighbor connection, which is used to determine the best path.

S6000

Syntax	`neighbor {`*`ip-address`*`	`*`peer-group-name`*`} weight `*`weight`* To remove a weight value, use the `no neighbor {`*`ip-address`*`	`*`peer-group-name`*`} weight` command.
Parameters	

ip-address	Enter the IP address of the peer router in dotted decimal format.
peer-group-name	Enter the name of the peer group to disable all routers within the peer group.
weight	Enter a number as the weight. The range is from 0 to 65535. The default is **0**.

Defaults	**0**
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

In the Dell Networking OS best path selection process, the path with the highest weight value is preferred.

NOTE: In the Dell Networking OS best-path selection process, the path with the highest weight value is preferred.

If you configure the `set weight` command in a route map applied to this neighbor, the weight set in that command overrides the weight set in the `neighbor weight` command.

Related Commands

set weight — assigns a weight to all paths meeting the route map criteria.

network

Specify the networks for the BGP process and enter them in the BGP routing table.

S6000

Syntax

`network ip-address mask [route-map map-name]`

To remove a network, use the `no network ip-address mask [route-map map-name]` command.

Parameters

ip-address	Enter an IP address in dotted decimal format of the network.
mask	Enter the mask of the IP address in the slash prefix length format (for example, /24). The mask appears in command outputs in dotted decimal format (A.B.C.D).
route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of an established route map. Only the following ROUTE-MAP mode commands are supported:

- match ip address
- set community
- set local-preference
- set metric
- set next-hop
- set origin
- set weight

If the route map is not configured, the default is **deny** (to drop all routes).

Defaults	Not configured.
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Dell Networking OS software resolves the network address the `network` command configures with the routes in the main routing table to ensure that the networks are reachable using non-BGP routes and non-default routes.

As BGP does not query next-hop information corresponding to locally originated routes, a local route with an unreachable next-hop is chosen as the best route.

When a combination of locally originated and peer originated routes occurs, both these routes will exist in the RTM. However, only the best route is kept active in the RTM and the remaining route is rendered in-active.

It is possible to keep only one locally originated route in the BGP database. Network command has preference over the re-distributed routes. When the locally originated route is no longer present in the database the other route is automatically installed.

In BGP, the next-hop for the route is calculated from the information that is acquired through IGP or static routes.

Related Commands	redistribute — redistributes routes into BGP.

network backdoor

Specify this IGP route as the preferred route.

S6000

Syntax

`network ip-address mask backdoor`

To remove a network, use the `no network ip-address mask backdoor` command.

Parameters

ip-address	Enter an IP address in dotted decimal format of the network.
mask	Enter the mask of the IP address in the slash prefix length format (for example, /24). The mask appears in command outputs in dotted decimal format (A.B.C.D).

Defaults: Not configured.

Command Modes: ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

Although Dell Networking OS does not generate a route due to the backdoor config, there is an option for injecting/sourcing a local route in the presence of network backdoor config on a learned route.

redistribute

Redistribute routes into BGP.

S6000

Syntax	`redistribute {connected | static} [route-map map-name]` To disable redistribution, use the `no redistribution {connected | static}` command.
Parameters	

connected	Enter the keyword `connected` to redistribute routes from physically connected interfaces.
static	Enter the keyword `static` to redistribute manually configured routes. These routes are treated as incomplete routes.
route-map *map-name*	(OPTIONAL) Enter the keyword `route-map` then the name of an established route map. Only the following ROUTE-MAP mode commands are supported: • match ip address • set community • set local-preference • set metric • set next-hop • set origin • set weight If the route map is not configured, the default is **deny** (to drop all routes).

Defaults	Not configured.
Command Modes	ROUTER BGP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced the ability to substitute IGP cost for MED when a peer/peer-group outbound route-map is set as **internal**.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

You can use the `redistribute` command to advertise the IGP cost as the MED on redistributed routes. When you set the route-map with metric-type internal and applied outbound to an EBGP peer/peer-group, the advertised routes corresponding to those peer/peer-groups have the IGP cost set as **MED**.

If you do not configure the `default-metric` command, in addition to the `redistribute` command, or there is no route map to set the metric, the metric for redistributed static and connected is "0".

To redistribute the default route (0.0.0.0/0), configure the `neighbor default-originate` command.

As BGP does not query next-hop information corresponding to locally originated routes, a local route with an unreachable next-hop is chosen as the best route.

When a combination of locally originated and peer originated routes occurs, both these routes will exist in the RTM. However, only the best route is kept active in the RTM and the remaining route is rendered in-active.

It is possible to keep only one locally originated route in the BGP database. Network command has preference over the re-distributed routes. When the locally originated route is no longer present in the database the other route is automatically installed.

Related Commands

neighbor default-originate — injects the default route.

redistribute ospf

Redistribute OSPF routes into BGP.

S6000

Syntax

`redistribute ospf` *`process-id`* `[[match external {1 | 2}] [match internal]] [route-map` *`map-name`*`]`

To stop redistribution of OSPF routes, use the `no redistribute ospf` *`process-id`* command.

Parameters

process-id	Enter the number of the OSPF process. The range is from 1 to 65535.
match external {1 | 2}	(OPTIONAL) Enter the keywords `match external` to redistribute OSPF external routes. You can specify `1` or `2` to redistribute those routes only.
match internal	(OPTIONAL) Enter the keywords `match internal` to redistribute OSPF internal routes only.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route map.

Defaults

Not configured.

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced the ability to substitute IGP cost for MED when a peer/peer-group outbound route-map is set as **internal**.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

You can use the `redistribute` command to advertise the IGP cost as the MED on redistributed routes. When you set the route-map with metric-type internal and apply outbound to an EBGP peer/peer-group, the advertised routes corresponding to those peer/peer-groups have the IGP cost set as **MED**.

When you enter the `redistribute isis` *`process-id`* command without any other parameters, Dell Networking OS redistributes all OSPF internal routes, external type 1 routes, and external type 2 routes. RFC does not support this feature.

router bgp

To configure and enable BGP, enter ROUTER BGP mode.

S6000

Syntax

`router bgp *as-number*`

To disable BGP, use the `no router bgp as-number` command.

Parameters

as-number	Enter the AS number. The range is from 1 to 65535 (2 byte), from 1 to 4294967295 (4 byte), or from 0.1 to 65535.65535 (dotted format).

Defaults

Not enabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

At least one interface must be in Layer 3 mode for the `router bgp` command to be accepted. If no interfaces are enabled for Layer 3, an error message appears:

```
% Error: No router id
configured
```

BGP does not allow 23456 (AS-TRANS) as a configured AS number.

Example

```
Dell(conf)#router bgp 3
Dell(conf-router_bgp)#
```

show capture bgp-pdu neighbor

Display BGP packet capture information for an IPv4 address on the system.

S6000

Syntax `show capture bgp-pdu neighbor` *`ipv4-address`*

Parameters

ipv4-address	Enter the IPv4 address (in dotted decimal format) of the BGP address to display packet information for that address.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.5.1.0	Introduced.

Example

```
Dell(conf-router_bgp)#show capture bgp-pdu neighbor 20.20.20.2

Incoming packet capture enabled for BGP neighbor 20.20.20.2
Available buffer size 40958758, 26 packet(s) captured using
680 bytes
  PDU[1] : len 101, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00650100 00000013
00000000
00000000 419ef06c 00000000
    00000000 00000000 00000000 00000000 0181a1e4 0181a25c
41af92c0
00000000 00000000 00000000
    00000000 00000001 0181a1e4 0181a25c 41af9400 00000000
  PDU[2] : len 19, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
  PDU[3] : len 19, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
 [. . .]

Outgoing packet capture enabled for BGP neighbor 20.20.20.2
Available buffer size 40958758, 27 packet(s) captured using
562 bytes
  PDU[1] : len 41, captured 00:34:52 ago
    ffffffff ffffffff ffffffff ffffffff 00290104 000100b4
```

```
14141401
0c020a01 04000100 01020080
    00000000
  PDU[2] : len 19, captured 00:34:51 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
  PDU[3] : len 19, captured 00:34:50 ago
    ffffffff ffffffff ffffffff ffffffff 00130400
 [. . .]
Dell#
```

show config

View the current ROUTER BGP configuration.

S6000

Syntax

`show config`

Command Modes

ROUTER BGP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Example

```
Dell(conf-router_bgp)#show config
!
router bgp 100
 network 1.1.11.1/32
 network 1.1.12.1/32
 network 1.1.13.1/32
 neighbor 10.1.1.2 remote-as 200
 neighbor 10.1.1.2 no shutdown
```

show ip bgp

View the current BGP IPv4 routing table for the system.

S6000

Syntax

`show ip bgp [vrf` *`vrf-name`*`] [`*`ipv4 unicast`*`] [network [`*`network-mask`*`] [longer-prefixes]]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view ipv4–unicast route information corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
network	(OPTIONAL) Enter the network address (in dotted decimal format) of the BGP network to view information only on that network.
network-mask	(OPTIONAL) Enter the network mask (in slash prefix format) of the BGP network address.
longer-prefixes	(OPTIONAL) Enter the keywords `longer-prefixes` to view all routes with a common prefix.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Added the `add-path` option to the S4810. Output on the S4810 shows the ADDPATH parameters.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

When you enable the `bgp non-deterministic-med` command, the `show ip bgp` command output for a BGP route does not list the INACTIVE reason.

In BGP, this command displays the exact reason why the route is discarded.

The following describes the `show ip bgp` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
Dell#show ip bgp
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network             Next Hop            Metric     LocPrf
Weight Path
*>  55.0.0.0/24
172.16.0.2                                  0 200 i
*>  66.0.0.0/24
172.16.0.2                                  0 200 i
```

Related Commands

show ip bgp community — views the BGP communities.

neighbor maximum-prefix — controls the number of network prefixes received.

show ip bgp cluster-list

View BGP neighbors in a specific cluster.

S6000

Syntax

`show ip bgp [vrf vrf-name] [ipv4 unicast] cluster-list [cluster-id]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view cluster information of BGP neighbors corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
cluster-id	(OPTIONAL) Enter the cluster id in dotted decimal format. The range is 1 — 4294967295.

Command Modes	- EXEC - EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp cluster-list` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
Dell#show ip bgp cluster-list
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.6
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>I 55.0.0.0/24        172.16.0.2
0      0 400 500 600 i
```

```
*>I 66.0.0.0/24        172.16.0.2
0      0 500 i
*>I 77.0.0.0/24        172.16.0.2
0      0 i

Dell#show ip bgp cluster-list 4.4.4.4
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.6
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>I 55.0.0.0/24        172.16.0.2
0      0 400 500 600 i
*>I 66.0.0.0/24        172.16.0.2
0      0 500 i
*>I 77.0.0.0/24        172.16.0.2
0      0 i
Dell#
```

show ip bgp community

View information on all routes with Community attributes or view specific BGP community groups.

S6000

Syntax

`show ip bgp [vrf` *`vrf-name`*`] [`*`ipv4 unicast`*`] community [`*`community-number`*`] [local-as] [no-export] [no-advertise]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view information either on all routes with community attributes or specific BGP community routes corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
community-number	Enter the community number in AA:NN format where AA is the AS number (2 bytes) and NN is a value specific to that autonomous system. You can specify up to eight community numbers to view information on those community groups.
local-AS	Enter the keywords `local-AS` to view all routes with the COMMUNITY attribute of NO_EXPORT_SUBCONFED. All routes with the NO_EXPORT_SUBCONFED (0xFFFFFF03) community attribute must not be advertised to external BGP peers.

no-advertise	Enter the keywords `no-advertise` to view all routes containing the well-known community attribute of NO_ADVERTISE. All routes with the NO_ADVERTISE (0xFFFFFF02) community attribute must not be advertised to other BGP peers.
no-export	Enter the keywords `no-export` to view all routes containing the well-known community attribute of NO_EXPORT. All routes with the NO_EXPORT (0xFFFFFF01) community attribute must not be advertised outside a BGP confederation boundary.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To view the total number of COMMUNITY attributes found, use the `show ip bgp summary` command. The text line above the route table states the number of COMMUNITY attributes found.

The `show ip bgp community` command without any parameters lists BGP routes with at least one BGP community attribute and the output is the same as for the `show ip bgp` command output.

The following describes the `show ip bgp community` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
Dell#show ip bgp community ?
local-AS                 Do not export outside local AS (well-
known community)
no-advertise             Do not advertise to any peer (well-
known community)
no-export                Do not export to next AS (well-known
community)
aa:nn                    Community number in aa:nn format
|                        Pipe through a command

Dell#show ip bgp community
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>  55.0.0.0/24
172.16.0.2                                 0 200 i
*>  66.0.0.0/24
172.16.0.2                                 0 200 i

Dell#show ip bgp community no-advertise
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>  66.0.0.0/24
172.16.0.2                                 0 200 i
```

show ip bgp community-list

View routes that a specific community list affects.

S6000

Syntax

`show ip bgp [vrf` *`vrf-name`*`] [`*`ipv4 unicast`*`] community-list` *`community-list-name`* `[exact-match]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view routes affected by a specific community list corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
community-list-name	Enter the name of a configured IP community list (maximum 140 characters).
exact-match	Enter the keyword for an exact match of the communities.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The `show ip bgp community-list` command without any parameters lists BGP routes matching the Community List and the output is the same as for the `show ip bgp` command output.

The following describes the `show ip bgp community-list pass` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
Dell#conf t
Dell(conf)#ip community-list cl1
Dell(config-community-list)#permit 1000:1
Dell(config-community-list)#end
Dell#show ip bgp community-list cl1
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>  55.0.0.0/24
172.16.0.2                                 0 200 i
Dell#show ip bgp 55.0.0.0/24
BGP routing table entry for 55.0.0.0/24
Paths: (1 available, table Default-IP-Routing-Table.)
Not advertised to any peer

Received from :
 172.16.0.2 (172.16.0.2)   Best
  AS_PATH : 200

  Next-Hop : 172.16.0.2, Cost : 0
  Origin IGP, Metric  4294967295 (Default), LocalPref  100,
Weight  0, external


 Communities :
  200:1        1000:1       3000:1
```

show ip bgp dampened-paths

View BGP routes that are dampened (non-active).

S6000

Syntax `show ip bgp [vrf vrf-name] [ipv4 unicast] dampened-paths`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view routes that are affected by a specific community list corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To determine a BGP session flap, both a route-down event and a subsequent route-up event corresponding to a single route are considered. As a result, a flap event is penalized only one time during the route-down event. The subsequent route-up event corresponding to the same route is not considered as a flap and is not penalized.

The history paths that the `show ip bgp` command displays contain only the prefix and the next-hop information. The next-hop information shows the ip address of the neighbor. It does not show the actual next-hop details.

The following describes the `show ip bgp damp` command shown in the following example.

Field	Description
Network	Displays the network ID to which the route is dampened.
From	Displays the IP address of the neighbor advertising the dampened route.
Reuse	Displays the hour:minutes:seconds until the dampened route is available.

Field	Description
Path	Lists all the ASs the dampened route passed through to reach the destination network.

Example

```
Dell#show ip bgp dampened-paths
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            From            Reuse     Path

d   55.0.0.0/24      172.16.0.2            00:36:23      200

Dell#
```

show ip bgp detail

Display BGP internal information for the IPv4 Unicast address family.

S6000

Syntax `show ip bgp [ipv4 unicast] detail`

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.5.1.0	Introduced.

Example

```
Dell#show ip bgp detail
Detail information for BGP Node
```

```
bgpNdP 0x41a17000 : NdTmrP 0x41a17000 : NdKATmrP 0x41a17014 :
NdTics 74857 :
NhLocAS 1 : NdState 2 : NdRPMPrim 1 : NdListSoc 13
NdAuto 1 : NdEqCost 1 : NdSync 0 : NdDefOrg 0
NdV6ListSoc 14 NdDefDid 0 : NdConfedId 0 : NdMedConfed 0 :
NdMedMissVal -1 :
NdIgnrIllId 0 : NdRRC2C 1 : NdClstId 33686273 : NdPaTblP
0x41a19088
NdASPTblP 0x41a19090 : NdCommTblP 0x41a19098 : NhOptTransTblP
0x41a190a0 :
NdRRClsTblP 0x41a190a8
NdPktPA 0 : NdLocCBP 0x41a6f000 : NdTmpPAP 0x419efc80 :
NdTmpASPAP 0x41a25000 :
NdTmpCommP 0x41a25800
NdTmpRRClP 0x41a4b000 : NdTmpOptP 0x41a4b800 : NdTmpNHP :
NdOrigPAP 0
NdOrgNHP 0 : NdModPathP 0x419efcc0 : NdModASPAP 0x41a4c000 :
NdModCommP 0x41a4c800
NdModOptP 0x41a4d000 : NdModNHP : NdComSortBufP 0x41a19110 :
NdComSortHdP
0x41a19d04 : NdUpdAFMsk 0 : AFRstSet 0x41a1a298 : NHopDfrdHdP
0x41a1a3e0 :

NumNhDfrd 0 : CfgHdrAFMsk 1
AFChkNetTmrP 0x41ee705c : AFRtDamp 0 : AlwysCmpMed 0 : LocrHld
10 : LocrRem 10 :
softReconfig 0x41a1a58c
DefMet 0 : AutoSumm 1 : NhopsP 0x41a0d100 : Starts 0 : Stops
0 : Opens 0
Closes 0 : Fails 0 : Fatals 0 : ConnExps 0 : HldExps 0 :
KeepExps 0
RxOpens 0 : RxKeeps 0 : RxUpds 0 : RxNotifs 0 : TxUpds 0 :
TxNotifs 0
BadEvts 0 : SynFails 0 : RxeCodeP 0x41a1b6b8 : RxHdrCodeP
0x41a1b6d4 : RxOpCodeP
0x41a1b6e4
RxUpdCodeP 0x41a1b704 : TxEcodeP 0x41a1b734 : TxHdrcodeP
0x41a1b750 : TxOpCodeP
0x41a1b760
TxUpdCodeP 0x41a1b780 : TrEvt 0 : LocPref 100 : tmpPathP
0x41a1b7b8 : LogNbrChgs 1
RecursiveNH 1 : PgCfgId 0 : KeepAlive 0 : HldTime 0 : DioHdl
0 : AggrValTmrP
0x41ee7024
UpdNetTmrP 0 : RedistTmrP 0x41ee7094 : PeerChgTmrP 0 :
CleanRibTmrP 0x41ee7104
PeerUpdTmrP 0x41ee70cc : DfrdNHTmrP 0x41ee7174 : DfrdRtselTmrP
0x41ee713c :
FastExtFallover 1 : FastIntFallover 0 : Enforce1stAS 1
PeerIdBitsP 0x41967120 : softOutSz 16 : RibUpdCtxCBP 0
UpdPeerCtxCBP 0 : UpdPeerCtxAFI 0 : TcpioCtxCB 0 : RedistBlk 1
NextCBPurg 1101119536 : NumPeerToPurge 0 : PeerIBGPCnt 0 :
NonDet 0 : DfrdPathSel 0
BGPRst 0 : NumGrCfg 1 : DfrdTmestmp 0 : SnmpTrps 0 :
IgnrBestPthASP 0
RstOn 1 : RstMod 1 : RstRole 2 : AFFalgs 7 : RstInt 120 :
MaxeorExtInt 361
FixedPartCrt 1 : VarParCrt 1
Packet Capture max allowed length 40960000 : current length 0

Peer Grp List
Nbr List
Confed Peer List
Address Family specific Information
```

```
AFIndex 0
NdSpFlag 0x41a190b0 : AFRttP 0x41a0d200 : NdRTMMkrP
0x41a19d28 : NdRTMAFTblVer 0 :
NdRibCtxAddr 1101110688
NdRibCtxAddrLen 255 : NdAFPrefix 0 : NdAfNLRIP 0 : NdAFNLRILen
0 : NdAFWPtrP 0
NdAFWLen 0 : NdAfNH : NdAFRedRttP 0x41a0d400 : NdRecCtxAdd
1101110868
NdRedCtxAddrLen 255 : NdAfRedMkrP 0x41a19e88 : AFAggRttP
0x41a0d600 : AfAggCtxAddr
1101111028 : AfAggrCtxAddrLen 255
AfNumAggrPfx 0 : AfNumAggrASSet 0 : AfNumSuppmap 0 :
AfNumAggrValidPfx 0 :
AfMPathRttP 0x41a0d700
MpathCtxAddr 1101111140 : MpathCtxAddrlen 255 : AfEorSet
0x41a19f98 : NumDfrdPfx 0
AfActPeerHd 0x41a1a3a4 : AfExtDist 1101112312 : AfIntDist
200 : AfLocDist 200
AfNumRRc 0 : AfRR 0 : AfNetRttP 0x41a0d300 : AfNetCtxAddr
1101112392 :
AfNetCtxAddrlen 255
AfNwCtxAddr 1101112443 : AfNwCtxAddrlen 255 : AfNetBKDrRttP
0x41a0d500 :
AfNetBKDRCnt 0 : AfDampHLife 0
AfDampReuse 0 : AfDampSupp 0 : AfDampMaxHld 0 : AfDampCeiling
0 : AfDampRmapP
```

show ip bgp extcommunity-list

View information on all routes with Extended Community attributes.

S6000

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 unicast] extcommunity-list
[list name]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view information on all routes with extended community attributes corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
list name	Enter the extended community list name you wish to view. The range is 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To view the total number of COMMUNITY attributes found, use the `show ip bgp summary` command. The text line above the route table states the number of COMMUNITY attributes found.

The `show ip bgp community` command without any parameters lists BGP routes with at least one BGP community attribute and the output is the same as for the `show ip bgp` command output.

Example

```
Dell#show run extcommunity-list
!
ip extcommunity-list ecl1
 permit rt 100:4
 permit soo 40:4
Dell#show ip bgp extcommunity-list ecl1
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>  55.0.0.0/24
172.16.0.2                                 0 200 i
*>  77.0.0.0/24
172.16.0.2                                 0 200 i
Dell#show ip bgp extcommunity-list ec
% Error: Extended community list does not exist.

Dell#
```

show ip bgp filter-list

View the routes that match the filter lists.

S6000

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 unicast] filter-list as-path-
name
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view route information that matches the filter lists corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
as-path-name	Enter an AS-PATH access list name. The range is 140 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp filter-list hello` command shown in the following example.

Field	Description
Path source codes	Lists the path sources shown to the right of the last AS number in the Path column: • i = internal route entry • a = aggregate route entry

Field	Description
	- c = external confederation route entry - n = network route entry - r = redistributed route entry
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route’s metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route’s weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
Dell#show run as-path a1
!
ip as-path access-list a1
 permit 500
Dell#

Dell#show ip bgp filter-list a1
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>  55.0.0.0/24
172.16.0.2                                 0 200 400 500 600 i
*>  66.0.0.0/24
172.16.0.2                                 0 200 500 i
```

show ip bgp flap-statistics

View flap statistics on BGP routes.

S6000

Syntax

`show ip bgp [vrf` *`vrf-name`*`] [`*`ipv4 unicast`*`] flap-statistics [`*`ip-address`*` [`*`mask`*`]] [filter-list` *`as-path-name`*`] [regexp` *`regular-expression`*`]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view flap statistics on BGP routes corresponding to that VRF.

ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
ip-address	(OPTIONAL) Enter the IP address (in dotted decimal format) of the BGP network to view information only on that network.
mask	(OPTIONAL) Enter the network mask (in slash prefix (/x) format) of the BGP network address.
filter-list *as-path-name*	(OPTIONAL) Enter the keyword `filter-list` then the name of a configured AS-PATH ACL. The range is 140 characters.
regexp *regular-expression*	Enter a regular expression then use one or a combination of the following characters to match. The range is 256 characters. • `.` = (period) any single character (including a white space). • `*` = (asterisk) the sequences in a pattern (zero or more sequences). • `+` = (plus) the sequences in a pattern (one or more sequences). • `?` = (question mark) sequences in a pattern (either zero or one sequences). **NOTE:** Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression. • `[ ]` = (brackets) a range of single-character patterns. • `( )` = (parenthesis) groups a series of pattern elements to a single element. • `{ }` = (braces) minimum and the maximum match count. • `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified. • `$` = (dollar sign) the end of the output string.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp flap` command shown in the following example.

Field	Description
Network	Displays the network ID to which the route is flapping.
From	Displays the IP address of the neighbor advertising the flapping route.
Flaps	Displays the number of times the route flapped.
Duration	Displays the hours:minutes:seconds since the route first flapped.
Reuse	Displays the hours:minutes:seconds until the flapped route is available.
Path	Lists all the ASs the flapping route passed through to reach the destination network.

Example

```
Dell#show ip bgp flap-statistics
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            From                 Flaps
Duration         Reuse    Path
h   77.0.0.0/24        172.16.0.2               1
00:00:03         00:00:00
d   55.0.0.0/24        172.16.0.2               3
00:00:25         00:30:44 200 i
*>  66.0.0.0/24        172.16.0.2               1
00:00:23         00:00:00 200 i
Dell#*>n 66.66.77.77/32   0.0.0.0        0          32768 i
```

show ip bgp inconsistent-as

View routes with inconsistent originating autonomous system (AS) numbers; that is, prefixes that are announced from the same neighbor AS but with a different AS-Path.

S6000

Syntax	`show ip bgp [vrf vrf-name] [ipv4 unicast] inconsistent-as`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view routes corresponding to the VRF that contain inconsistent originating AS numbers.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp inconsistent-as` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then local routes exist in the routing table.
Metric	Displays the BGP route’s metric, if assigned.

Field	Description
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route’s weight.
Path	Lists all the ASs the route passed through to reach the destination network.

Example

```
Dell>show ip bgp inconsistent-as
BGP table version is 280852, local router ID is 10.1.2.100
Status codes: s suppressed, d damped, h history, * valid, >
best
Path source: I - internal, c - confed-external, r -
redistributed, n - network
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network Next  Hop         Metric LocPrf Weight Path
*  3.0.0.0/8     63.114.8.33                0 18508 209 7018
80 i
*                63.114.8.34                0 18508 209 7018
80 i
*                63.114.8.60                0 18508 209 7018
80 i
*>               63.114.8.33                0 18508 701 80 i
*> 3.18.135.0/24 63.114.8.60                0 18508 209 7018 ?
*                63.114.8.34                0 18508 209 7018 ?
*                63.114.8.33                0 18508 701 7018 ?
*                63.114.8.33                0 18508 209 7018 ?
*> 4.0.0.0/8     63.114.8.60                0 18508 209 1 i
*                63.114.8.34                0 18508 209 1 i
*                63.114.8.33                0 18508 701 1 i
*                63.114.8.33                0 18508 209 1 i
*  6.0.0.0/20    63.114.8.60                0 18508 209 3549 i
*                63.114.8.34                0 18508 209 3549 i
*>               63.114.8.33      0         0 18508 ?
*                63.114.8.33                0 18508 209 3549 i
*  9.2.0.0/16    63.114.8.60                0 18508 209 701 i
*                63.114.8.34                0 18508 209 701 i
--More--

Dell>sho ip bgp vrf testinconsistent-as
BGP table version is 11, local router ID is 66.66.77.77
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

Network          Next Hop  Metric  LocPrf Weight Path
*>n 11.11.11.11/32   0.0.0.0        0          32768 i
*>n 22.22.22.22/32   0.0.0.0        0          32768 i
I 32.32.32.32/32   60.0.0.2             100      0 400 500 i
  I 32.32.33.33/32   60.0.0.2             100      0 400 500 i
*>n 33.33.33.33/32   0.0.0.0        0          32768 i
*>n 33.33.44.55/32   0.0.0.0        0          32768 i
*>n 44.44.44.44/32   0.0.0.0        0          32768 i
*>I 55.55.0.0/16     72.1.1.2             100      0 i
*>I 55.55.55.55/32   72.1.1.2       0     100      0 i
*>I 55.55.66.66/32   72.1.1.2       0     100      0 i
*>a 66.66.0.0/16     0.0.0.0                   32768 i
```

```
*>n 66.66.66.77/32   0.0.0.0        0          32768 i
*>n 66.66.77.77/32   0.0.0.0        0          32768 i
```

show ip bgp neighbors

Allows you to view the information BGP neighbors exchange.

S6000

Syntax

`show ip bgp [vrf vrf-name] [ipv4 unicast] neighbors [ip-address [advertised-routes | dampened-routes | detail | flap-statistics | routes | {received-routes [network [network-mask]]} | {denied-routes [network [network-mask]]}]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view information exchanged by BGP neighbors corresponding to that VRF. NOTE: You can use this attribute to view information exchanged by BGP neighbors that correspond to either a default or a non-default VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
ip-address	(OPTIONAL) Enter the IP address of the neighbor to view only BGP information exchanged with that neighbor.
advertised-routes	(OPTIONAL) Enter the keywords `advertised-routes` to view only the routes the neighbor sent.
dampened-routes	(OPTIONAL) Enter the keywords `dampened-routes` to view information on dampened routes from the BGP neighbor.
detail	(OPTIONAL) Enter the keyword `detail` to view neighbor-specific internal information for the IPv4 Unicast address family.
flap-statistics	(OPTIONAL) Enter the keywords `flap-statistics` to view flap statistics on the neighbor's routes.
routes	(OPTIONAL) Enter the keyword `routes` to view only the neighbor's feasible routes.
received-routes [*network* [*network-mask*]	(OPTIONAL) Enter the keywords `received-routes` then either the network address (in dotted decimal format) or the network mask (in slash prefix format) to view all information received from neighbors. NOTE: Configure the `neighbor soft-reconfiguration inbound` command prior to viewing all the information received from the neighbors.

denied-routes [*network* [*network-mask*]	(OPTIONAL) Enter the keywords `denied-routes` then either the network address (in dotted decimal format) or the network mask (in slash prefix format) to view all information on routes denied via neighbor inbound filters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Added the `add-path` option to the S4810. Output on the S4810 shows the ADDPATH parameters.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.5.1.0	Added the `detail` option. Output now displays the default MED value.
Version 7.2.1.0	Added the `received` and `denied route` options.
Version 6.3.10	The output is changed to display the total number of advertised prefixes.

Usage Information

After a peer reset, the contents of the notification log messages is displayed in hex values for debugging.

The neighbor information that this command displays does not include counts corresponding to ignored prefixes and updates. However, the martian case is an exception where neighbor information corresponding to ignored updates is displayed.

BGP shows the exact information that is exchanged between the BGP peers. It also indicates whether or not this information is received by the BGP peer.

The following describes the `show ip bgp neighbors` command shown in the following examples.

The Lines Beginning with:	Description
BGP neighbor	Displays the BGP neighbor address and its AS number. The last phrase in the line indicates whether the link between the BGP router and its neighbor is an external or internal one. If they are located in the same AS, the link is internal; otherwise the link is external.
BGP version	Displays the BGP version (always version 4) and the remote router ID.
BGP state	Displays the neighbor's BGP state and the amount of time in hours:minutes:seconds it has been in that state.
Last read	This line displays the following information: • last read is the time (hours:minutes:seconds) the router read a message from its neighbor • hold time is the number of seconds configured between messages from its neighbor • keepalive interval is the number of seconds between keepalive messages to help ensure that the TCP session is still alive.
Received messages	This line displays the number of BGP messages received, the number of notifications (error messages), and the number of messages waiting in a queue for processing.
Sent messages	The line displays the number of BGP messages sent, the number of notifications (error messages), and the number of messages waiting in a queue for processing.
Received updates	This line displays the number of BGP updates received and sent.
Soft reconfiguration	This line indicates that soft reconfiguration inbound is configured.
Minimum time	Displays the minimum time, in seconds, between advertisements.
(list of inbound and outbound policies)	Displays the policy commands configured and the names of the Route map, AS-PATH ACL, or Prefix list configured for the policy.
For address family:	Displays the IPv4 Unicast as the address family.
BGP table version	Displays which version of the primary BGP routing table the router and the neighbor are using.
accepted prefixes	Displays the number of network prefixes the router accepts and the amount of memory used to process those prefixes.

The Lines Beginning with:	Description
Prefix advertised	Displays the number of network prefixes advertised, the number rejected, and the number withdrawn from the BGP routing table.
Connections established	Displays the number of TCP connections established and dropped between the two peers to exchange BGP information.
Last reset	Displays the amount of time since the peering session was last reset. Also states if the peer resets the peering session. If the peering session was never reset, the word never is displayed.
Local host:	Displays the peering address of the local router and the TCP port number.
Foreign host:	Displays the peering address of the neighbor and the TCP port number.

Example

```
Dell#show ip bgp neighbors 172.16.0.2
BGP neighbor is 172.16.0.2, remote AS 200, external link
  Member of peer-group port0 for session parameters
  BGP remote router ID 172.16.0.2
  BGP state ESTABLISHED, in this state for 00:13:55
  Last read 00:00:03, Last write 00:00:55
  Hold time is 180, keepalive interval is 60 seconds
  Received 50 messages, 0 in queue
     1 opens, 0 notifications, 34 updates
     15 keepalives, 0 route refresh requests
  Sent 18 messages, 0 in queue
     1 opens, 0 notifications, 0 updates
     16 keepalives, 0 route refresh requests

  Route refresh request: received 0, sent messages 1
  Minimum time between advertisement runs is 30 seconds
  Minimum time before advertisements start is 0 seconds

  Capabilities received from neighbor for IPv4 Unicast :
    MULTIPROTO_EXT(1)
    ROUTE_REFRESH(2)



  Capabilities advertised to neighbor for IPv4 Unicast :
    MULTIPROTO_EXT(1)
    ROUTE_REFRESH(2)
    ADD_PATH(69)
    CISCO_ROUTE_REFRESH(128)




  For address family: IPv4 Unicast
  BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
  InQ : Added 0, Replaced 0, Withdrawn 0
  OutQ : Added 0, Withdrawn 0
  Allow local AS number 0 times in AS-PATH attribute
  Prefixes accepted 2, withdrawn 15 by peer, martian prefixes
ignored 0
  Prefixes advertised 0, denied 0, withdrawn 0 from peer

  Connections established 1; dropped 0
  Last reset never
Local host: 172.16.0.1, Local port: 58145
Foreign host: 172.16.0.2, Foreign port: 179

Dell#
```

Related Commands

show ip bgp — views the current BGP routing table.

show ip bgp next-hop

View all next hops (using learned routes only) with current reachability and flap status. This command only displays one path, even if the next hop is reachable by multiple paths.

S6000

Syntax `show ip bgp [vrf vrf-name] next-hop`

Parameters

vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view all next hops corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp next-hop` command shown in the following example.

Field	Description
Next-hop	Displays the next-hop IP address.
Via	Displays the IP address and interface used to reach the next hop.
RefCount	Displays the number of BGP routes using this next hop.
Cost	Displays the cost associated with using this next hop.
Flaps	Displays the number of times the next hop has flapped.
Time Elapsed	Displays the time elapsed since the next hop was learned. If the route is down, this field displays time elapsed since the route went down.

Example

```
Dell#   show ip bgp next-hop
     Next-hop            Resolved
    172.16.0.2             YES
Dell#
```

show ip bgp paths

View all the BGP path attributes in the BGP database.

S6000

Syntax `show ip bgp[vrf` *`vrf-name`*`] paths [regexp` *`regular-expression`*`]`

Parameters

vrf *vrf-name*

(OPTIONAL) Enter the keyword `vrf` to view all path attributes in the BGP database corresponding to that VRF.

> **NOTE:** You can use this attribute to view information on all path attributes in the BGP database that correspond to either a default or a non-default VRF.

regexp *regular-expression*

Enter a regular expression then use one or a combination of the following characters to match:

- `.` = (period) any single character (including a white space).
- `*` = (asterisk) the sequences in a pattern (zero or more sequences).
- `+` = (plus) the sequences in a pattern (one or more sequences).
- `?` = (question mark) sequences in a pattern (either zero or one sequences).

  > **NOTE:** Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression.
- `[ ]` = (brackets) a range of single-character patterns.
- `( )` = (parenthesis) groups a series of pattern elements to a single element.

- `{ }` = (braces) minimum and the maximum match count.
- `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified.
- `$` = (dollar sign) the end of the output string.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF for the S4810, S4820T, and S6000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp path` command shown in the following example.

Field	Description
Total	Displays the total number of BGP path attributes.
Address	Displays the internal address where the path attribute is stored.
Hash	Displays the hash bucket where the path attribute is stored.
Refcount	Displays the number of BGP routes using this path attribute.
Metric	Displays the MED attribute for this path attribute.
Path	Displays the AS path for the route, with the origin code for the route listed last. Numbers listed between braces {} are AS_SET information.

Example

```
Dell#show ip bgp paths ?
community               Display community information
extcommunity            Display extended community information
regexp                  Display path information based on a
regular expression
|                       Pipe through a command
```

```
Dell#show ip bgp paths
Total 2 Paths
Refcount Metric Path
1       0          200 i
1       0          200 i
```

show ip bgp paths community

View all unique COMMUNITY numbers in the BGP database.

S6000

Syntax `show ip bgp [vrf vrf-name] paths community`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` to view all unique COMMUNITY numbers in the BGP database corresponding to that VRF. NOTE: You can use this attribute to view information on unique COMMUNITY numbers in a BGP database that correspond to either a default or a non-default VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp paths community` command shown in the following example.

Field	Description
Address	Displays the internal address where the path attribute is stored.
Hash	Displays the hash bucket where the path attribute is stored.
Refcount	Displays the number of BGP routes using these communities.
Community	Displays the community attributes in this BGP path.

Example

```
Dell#show ip bgp paths community
Total 2 communities
Refcount   Community
1         NO-ADVERTISE
1         200:1       1000:1       3000:1
```

show ip bgp peer-group

Allows you to view information on the BGP peers in a peer group.

S6000

Syntax `show ip bgp [vrf vrf-name] [ipv4 unicast] peer-group [peer-group-name [detail | summary]]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` to view information on BGP peers in a peer group corresponding to that VRF. **NOTE:** You can use this attribute to view information on BGP peers in a peer group that correspond to either a default or a non-default VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.
peer-group-name	(OPTIONAL) Enter the name of a peer group to view information about that peer group only.
detail	(OPTIONAL) Enter the keyword `detail` to view detailed status information of the peers in that peer group.
summary	(OPTIONAL) Enter the keyword `summary` to view status information of the peers in that peer group. The output is the same as that found in the `show ip bgp summary` command.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Added the `add-path` option to the S4810. Output on the S4810 shows the ADDPATH parameters.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp peer-group` command shown in the following example.

Line beginning with:	Description
Peer-group	Displays the peer group's name.
Administratively shut	Displays the peer group's status if the peer group is not enabled. If you enable the peer group, this line is not displayed.
BGP version	Displays the BGP version supported.
Minimum time	Displays the time interval between BGP advertisements.
For address family	Displays IPv4 Unicast as the address family.
BGP neighbor	Displays the name of the BGP neighbor.
Number of peers	Displays the number of peers currently configured for this peer group.
Peer-group members:	Lists the IP addresses of the peers in the peer group. If the address is outbound optimized, an * is displayed next to the IP address.

Example

```
Dell#show ip bgp peer-group
Peer-group port0, remote AS 200
BGP version 4
Minimum time between advertisement runs is 30 seconds
For address family: IPv4 Unicast
BGP neighbor is port0, peer-group external
Update packing has 4_OCTET_AS support enabled

Number of peers in this group 1
Maximum limit on the accepted connections 256
```

```
 Peer-group members (* - outbound optimized):
172.16.0.2
Dell#
```

Related Commands

neighbor peer-group (assigning peers) — assigns a peer to a peer-group.

neighbor peer-group (creating group) — creates a peer group.

show ip bgp regexp

Display the subset of the BGP routing tables matching the regular expressions specified.

S6000

Syntax

`show ip bgp [vrf vrf-name] regexp regular-expression [character]`

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to view the subset of BGP routing tables that match the regular expression specified on that VRF. NOTE: You can use this attribute to view the subset of BGP routing tables that match the regular expression that is specified on either a default or a non-default VRF.
regular-expression [*character*]	Enter a regular expression then use one or a combination of the following characters to match: • `.` = (period) any single character (including a white space). • `*` = (asterisk) the sequences in a pattern (zero or more sequences). • `+` = (plus) the sequences in a pattern (one or more sequences). • `?` = (question mark) sequences in a pattern (either zero or one sequences). NOTE: Enter an escape sequence (CTRL+v) prior to entering the `?` regular expression. • `[ ]` = (brackets) a range of single-character patterns. • `( )` = (parenthesis) groups a series of pattern elements to a single element. • `{ }` = (braces) minimum and the maximum match count. • `^` = (caret) the beginning of the input string. If you use the caret at the beginning of a sequence or range, it matches on everything BUT the characters specified. • `$` = (dollar sign) the end of the output string.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

The following describes the `show ip bgp regexp` command shown in the following example.

Field	Description
Network	Displays the destination network prefix of each BGP route.
Next Hop	Displays the next hop address of the BGP router. If 0.0.0.0 is listed in this column, then non-BGP routes exist in the router's routing table.
Metric	Displays the BGP router's metric, if assigned.
LocPrf	Displays the BGP LOCAL_PREF attribute for the route.
Weight	Displays the route's weight
Path	Lists all the AS paths the route passed through to reach the destination network.

Example

```
Dell#show ip bgp regexp ^200
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            Next Hop            Metric     LocPrf
Weight Path
*>  55.0.0.0/24
172.16.0.2                                 0 200 i
```

```
*>  66.0.0.0/24
172.16.0.2                                0 200 i
```

show ip bgp summary

Allows you to view the status of all BGP connections.

S6000

Syntax	`show ip bgp [vrf vrf-name] [ipv4 unicast] summary`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view the status of all BGP connections corresponding to that VRF.
ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

In BGP, route attributes are maintained at different locations. When attributes that correspond to multiple routes change, then attribute counts that the `show ip bgp summary` command displays are calculated as summations of attributes corresponding to all the associated routes. For example, if cluster_id is an attribute associated with thousand routes that contain exactly the same set of attributes, then the cluster_id count is 1. If these thousand routes are set with different attribute values with the same cluster_id, then the cluster_id count is 1000, since the same value is stored for thousand different attribute records.

The attribute next-hop is a part of the BGP attribute data structure.

If two peers send the same route that contains similar path attributes, then two entries are maintained in the back-end, as both these entries have different next-hops. If this same route is sent to a different peer, an entry for each peer is created, as the next-hop is different. As a result, the BGP attributes count in the summary output will differ accordingly.

The following describes the `show ip bgp summary` command shown in the following example.

Field	Description
BGP router identifier	Displays the local router ID and the AS number.
BGP table version	Displays the BGP table version and the main routing table version.
network entries	Displays the number of network entries, route paths, and the amount of memory used to process those entries.
paths	Displays the number of paths and the amount of memory used.
denied paths	Displays the number of denied paths and the amount of memory used.
BGP path attribute entries	Displays the number of BGP path attributes and the amount of memory used to process them.
BGP AS-PATH entries	Displays the number of BGP AS_PATH attributes processed and the amount of memory used to process them.
BGP community entries	Displays the number of BGP COMMUNITY attributes processed and the amount of memory used to process them. The `show ip bgp community` command provides more details on the COMMUNITY attributes.
Dampening enabled	Displayed only when you enable dampening. Displays the number of paths designated as history, dampened, or penalized.
Neighbor	Displays the BGP neighbor address.
AS	Displays the AS number of the neighbor.
MsgRcvd	Displays the number of BGP messages that neighbor received.
MsgSent	Displays the number of BGP messages that neighbor sent.
TblVer	Displays the version of the BGP table that was sent to that neighbor.
InQ	Displays the number of messages from that neighbor waiting to be processed.
OutQ	Displays the number of messages waiting to be sent to that neighbor. If a number appears in parentheses, the number

<table>
<tr><th>Field</th><th>Description</th></tr>
<tr><td></td><td>represents the number of messages waiting to be sent to the peer group.</td></tr>
<tr><td>Up/Down</td><td>Displays the amount of time that the neighbor is in the Established stage. If the neighbor has never moved into the Established stage, the word never is displayed.
The output format is:
<table>
<tr><th>Time Established</th><th>Display Example</th></tr>
<tr><td>< 1 day</td><td>00:12:23 (hours:minutes:seconds)</td></tr>
<tr><td>< 1 week</td><td>1d21h (DaysHours)</td></tr>
<tr><td>> 1 week</td><td>11w2d (WeeksDays)</td></tr>
</table></td></tr>
<tr><td>State/Pfxrcd</td><td>If the neighbor is in Established stage, the number of network prefixes received.
If a maximum limit was configured with the <code>neighbor maximum-prefix</code> command, (prfxd) appears in this column.
If the neighbor is not in Established stage, the current stage is displayed (Idle, Connect, Active, OpenSent, OpenConfirm). When the peer is transitioning between states and clearing the routes received, the phrase (Purging) may appear in this column.
If the neighbor is disabled, the phrase (Admin shut) appears in this column.</td></tr>
</table>

Example (S4810)

```
Dell#show ip bgp summary
BGP router identifier 192.168.11.5, local AS number 100
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
2 network entrie(s) using 152 bytes of memory
2 paths using 208 bytes of memory
BGP-RIB over all using 210 bytes of memory
2 BGP path attribute entrie(s) using 144 bytes of memory
1 BGP AS-PATH entrie(s) using 10 bytes of memory
2 neighbor(s) using 16384 bytes of memory

Neighbor        AS            MsgRcvd  MsgSent     TblVer
InQ  OutQ Up/Down  State/Pfx
172.16.0.2      200                10        8          0
0     0 00:05:34 2
192.168.10.2    100                 0       22          0
0     0 00:00:00 (shut)
Dell#
```

show running-config bgp

To display the current BGP configuration, use this feature.

S6000

Syntax	`show running-config bgp`
Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced on the E-Series.

Example

```
Dell#show running-config bgp
!
router bgp 100
 network 1.1.11.1/32
 network 1.1.12.1/32
 network 1.1.13.1/32
 neighbor 10.1.1.2 remote-as 200
 neighbor 10.1.1.2 no shutdown
Dell#
```

timers bgp

Adjust the BGP Keep Alive and Hold Time timers.

S6000

Syntax

`timers bgp` *`keepalive holdtime`*

To return to the default, use the `no timers bgp` command.

Parameters

keepalive	Enter a number for the time interval, in seconds, between keepalive messages sent to the neighbor routers. The range is from 1 to 65535. The default is **60 seconds**.

holdtime	Enter a number for the time interval, in seconds, between the last keepalive message and declaring the router dead. The range is from 3 to 65535. The default is **180 seconds**.

Defaults none

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced on the E-Series.

MBGP Commands

Multiprotocol BGP (MBGP) is an enhanced BGP that enables multicast routing policy throughout the internet and connecting multicast topologies between BGP and autonomous systems (ASs).

Dell Networking OS MBGP is implemented as per IETF RFC 1858.

BGPv4 is supported in the following:

Dell Networking OS Version	Platform Support
7.8.1.0, MBGP for IPv4 Multicast Only	S-Series

debug ip bgp dampening

View information on routes being dampened.

S6000

Syntax

```
debug ip bgp [vrf test | ipv4 {unicast | multicast} | ipv6
{unicast | multicast} dampening
```

To disable debugging, use the `no debug ip bgp ipv4 multicast dampening` command.

Parameters		
	dampening	Enter the keyword `dampening` to debug route flap dampening information.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced IPv6 MGBP support for the E-Series.

show ip bgp dampened-paths

View BGP routes that are dampened (non-active).

S6000

Syntax

```
show ip bgp [vrf vrf-name] [ipv4 unicast] dampened-paths
```

Parameters		
	vrf *vrf-name*	(OPTIONAL) Enter the keywords `vrf` and then the name of the VRF to view routes that are affected by a specific community list corresponding to that VRF.
	ipv4 unicast	(OPTIONAL) Enter the keywords `ipv4 unicast` to view information only related to ipv4 unicast routes.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Usage Information

To determine a BGP session flap, both a route-down event and a subsequent route-up event corresponding to a single route are considered. As a result, a flap event is penalized only one time during the route-down event. The subsequent route-up event corresponding to the same route is not considered as a flap and is not penalized.

The history paths that the `show ip bgp` command displays contain only the prefix and the next-hop information. The next-hop information shows the ip address of the neighbor. It does not show the actual next-hop details.

The following describes the `show ip bgp damp` command shown in the following example.

Field	Description
Network	Displays the network ID to which the route is dampened.
From	Displays the IP address of the neighbor advertising the dampened route.
Reuse	Displays the hour:minutes:seconds until the dampened route is available.
Path	Lists all the ASs the dampened route passed through to reach the destination network.

Example

```
Dell#show ip bgp dampened-paths
BGP local RIB : Routes to be Added 0, Replaced 0, Withdrawn 0
BGP local router ID is 192.168.11.5
Status codes: s suppressed, S stale, d dampened, h history, *
valid, > best
Path source: I - internal, a - aggregate, c - confed-external,
r - redistributed
             n - network,  D - denied,  S - stale
Origin codes: i - IGP, e - EGP, ? - incomplete

    Network            From            Reuse      Path

d   55.0.0.0/24      172.16.0.2            00:36:23      200

Dell#
```

10

Content Addressable Memory (CAM)

Content addressable memory (CAM) commands are supported on the Dell Networking S6000 platform.

NOTE: Not all CAM commands are supported on all platforms. Be sure to note the platform when looking for a command.

WARNING: If you are using these features for the first time, contact Dell Networking Technical Assistance Center (TAC) for guidance.

CAM Profile Commands

The CAM profiling feature allows you to partition the CAM to best suit your application. For example:

- Configure more Layer 2 forwarding information base (FIB) entries when the system is deployed as a switch.
- Configure more Layer 3 FIB entries when the system is deployed as a router.
- Configure more access control lists (ACLs) (when IPv6 is not employed).
- Hash multi-protocol label switching (MPLS) packets based on source and destination IP addresses for link aggregation groups (LAGs).
- Hash based on bidirectional flow for LAGs.
- Optimize the virtual local area network (VLAN) ACL Group feature, which permits group VLANs for IP egress ACLs.

Important Points to Remember

- Dell Networking OS supports CAM allocations on the C-Series and S-Series.
- All line cards within a single system must have the same CAM profile (including CAM sub-region configurations); this profile must match the system CAM profile (the profile on the primary route processor module [RPM]).
- Dell Networking OS automatically reconfigures the CAM profile on line cards and the secondary RPM to match the system CAM profile by saving the correct profile on the card and then rebooting it.
- The CAM configuration is applied to the entire system when you use the CONFIGURATION mode commands. Save the running-configuration to affect the change.
- When budgeting your CAM allocations for ACLs and quality of service (QoS) configurations, remember that ACL and QoS rules might consume more than one CAM entry depending on complexity. For example, transmission control protocol (TCP) and user datagram protocol (UDP) rules with `port range` options might require more than one CAM entry.
- After you install a secondary RPM, copy the running-configuration to the startup-configuration so that the new RPM has the correct CAM profile.
- You MUST save your changes and reboot the system for CAM profiling or allocations to take effect.

cam-acl (Configuration)

Select the default CAM allocation settings or reconfigure a new CAM allocation for Layer 2, IPv4, and IPv6 ACLs, Layer 2 and Layer 3 (IPv4) QoS, Layer 2 Protocol Tunneling (L2PT), IP and MAC source address validation for DHCP, Ethernet Connectivity Fault Management (CFM) ACLs, OpenFlow, and Policy-based Routing (PBR).

S6000

Syntax

```
cam-acl {default | l2acl number ipv4acl number ipv6acl number
ipv4qos number l2qos number l2pt number ipmacacl number [vman-
qos | vman-dual-qos number] ecfmacl number ipv4pbr
number }openflow number | fcoe number} [iscsioptacl number]
[vrfv4acl number]
```

Parameters

default	Use the default CAM profile settings and set the CAM as follows: • L2Acl : 6 • IPV4Acl : 4 • IPV6Acl : 0 • IPV4Qos : 2 • L2Qos : 1 • L2PT : 0 • IpMacAcl : 0 • VmanQos : 0 • VmanDualQos : 0 • EcfmAcl : 0 • FcoeAcl : 0 • iscsiOptAcl : 0 • ipv4pbr : 0 • vrfv4Acl :0 • Openflow : 0 • fedgovacl : 0
l2acl *number*	Enter the keyword `l2acl` and then the number of l2acl blocks. The range is from 1 to 8.
ipv4acl *number*	Enter the keyword `ipv4acl` and then the number of FP blocks for IPv4. The range is from 0 to 8.
ipv6acl *number*	Enter the keyword `ipv6acl` and then the number of FP blocks for IPv6. The range is from 0 to 4.
ipv4qos *number*	Enter the keyword `ipv4qos` and then the number of FP blocks for IPv4. The range is from 0 to 8.
l2qos *number*	Enter the keyword `l2qos` and then the number of FP blocks for l2 qos. The range is from 1to 8.
l2pt *number*	Enter the keyword `l2pt` and then the number of FP blocks for l2 protocol tunnelling. The range is from 0 to 1.
Ipmacacl *number*	Enter the keyword `ipmacacl` and then the number of FP blocks for IP and MAC ACL. The range is from 0 to 6.

ecfmacl *number*	Enter the keyword `ecfmacacl` and then the number of FP blocks for ECFM ACL. The range is from 0 to 5.
Vman-qos| vman-dual-qos *number*	Enter the keyword `evman-qos` and then the number of FP blocks for VMAN QoS. The range is from 0 to 6.
vman-dual-qos *number*	Enter the keyword `vman-dual-qos` and then the number of FP blocks for VMAN dual QoS. The range is from 0 to 4.
Ipv4pbr *number*	Enter the keyword `ipv4pbr` and then the number of FP blocks for ipv4pbr ACL. The range is from 0 to 8.
Openflow *number*	Enter the keyword `openflow` and then the number of FP blocks for open flow (multiples of 4). The range is from 0 to 8.
fcoeacl *number*	Enter the keyword `fcoeacl` and then the number of FP blocks for FCOE ACL. The range is from 0 to 6.
Iscsioptacl *number*	Enter the keyword `iscsioptacl` and then the number of FP blocks for iSCSI optimization ACL. The range is from 0 to 2.
vrfv4acl *number*	Enter the keyword `vrfv4acl` and then the number of FP blocks for VRF IPv4 ACL. The range is from 0 to 2.
l2acl *number* ipv4acl *number* ipv6acl *number*, ipv4qos *number* l2qos *number*l2pt *number* ipmacacl *number* ecfmacl *number* [vman-qos | vman-dual-qos *number*] ipv4pbr *number*openflow {4|8} | fcoe *number* [iscsioptacl *number*] [vrfv4acl *number*]	Allocate space to each CAM region. Enter 4 or 8 for the number of OpenFlow FP blocks. • 4: Creates 242 entries for use by the OpenFlow controller (256 total entries minus the 14 entries reserved for internal functionality) • 8: Creates 498 entries for use by the OpenFlow controller (512 total entries minus the 14 entries reserved for internal functionality) The fcoe range is 0–6 groups. Each group has 128 entries; the value given must be an even number. This information is stored in the NVRAM and is effective after rebooting the switch.

Command Modes	CONFIGURATION

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for PBR and VRF.
Version 9.2(0.2)	Added support for fcoe.
Version 9.1.(0.0)	Added support for OpenFlow.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.2	Clarified block information for the S4810.
Version 8.3.10.0	Introduced on the S4810.
Version 8.3.1.0	Added the keywords `ecfmacl`, `vman-qos`, and `vman-dual-qos`.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.8.1.0	Introduced on the C-Series.

Usage Information	Save the new CAM settings to the startup-config (`write-mem` or `copy run start`) then reload the system for the new settings to take effect. The total amount of space allowed is 16 FP Blocks. System flow requires three blocks; these blocks cannot be reallocated. Only 13 number of blocks can be configured by the user . The `ipv6acl` allocation must be a factor of 2. If allocation values are not entered for the CAM regions, the value is 0. If you enable BMP 3.0, to perform a reload on the chassis to upgrade any configuration changes that have changed the NVRAM content, use the command `reload conditional nvram-cfg-change`.

cam-acl-egress

Allocate CAM for egress ACLs.

S6000

Syntax	`cam-acl-egress` *`default	l2acl number ipv4acl number ipv6acl number`*

Parameters

default	Reset egress CAM ACL entries to default settings.
l2acl *number*	Allocate space to each CAM region. The total space allocated must equal 4. The ipv6acl range must be a factor of 2.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant Dell Networking OS Command Line Reference Guide.

The following is a list of the Dell Networking OS version history for this command..

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

cam-optimization

Optimize CAM utilization for QoS Entries by minimizing require policy-map CAM space.

S6000

Syntax

`cam-optimization [qos]`

Parameters

qos	Optimize CAM usage for QoS.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the S-Series.

Version 7.8.1.0	Introduced on the C-Series.

Usage Information

When you enable this command, if a Policy Map containing classification rules (ACL and/or dscp/ ip-precedence rules) is applied to more than one physical interface on the same port pipe, only a single copy of the policy is written (only one FP entry is used).

NOTE: An ACL itself may still require more that a single FP entry, regardless of the number of interfaces. For more information, refer to the "IP Access Control Lists", "Prefix Lists", and "Route-map" sections in the *Dell Networking OS Configuration Guide*.

show cam-acl

Display the details of the CAM profiles on the chassis and all line cards.

S6000

Syntax

`show cam-acl`

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series.

Usage Information

The display reflects the settings implemented with the `cam-acl` command.

Example (S6000 Default)

```
Dell#show cam-acl (Default)

-- Chassis Cam ACL --
             Current Settings(in block sizes)
                   1 block = 128 entries
L2Acl        :        6
Ipv4Acl      :        4
Ipv6Acl      :        0
Ipv4Qos      :        2
L2Qos        :        1
L2PT         :        0
IpMacAcl     :        0
VmanQos      :        0
```

```
VmanDualQos  :         0
EcfmAcl      :         0
FcoeAcl      :         0
iscsiOptAcl  :         0
ipv4pbr      :         0
vrfv4Acl     :         0
Openflow     :         0
fedgovacl    :         0

-- stack-unit 0 --
           Current Settings(in block sizes)
                   1 block = 128 entries
L2Acl        :         6
Ipv4Acl      :         4
Ipv6Acl      :         0
Ipv4Qos      :         2
L2Qos        :         1
L2PT         :         0
IpMacAcl     :         0
VmanQos      :         0
VmanDualQos  :         0
EcfmAcl      :         0
FcoeAcl      :         0
iscsiOptAcl  :         0
ipv4pbr      :         0
vrfv4Acl     :         0
Openflow     :         0
fedgovacl    :         0
```

Example (Non-Default)

```
Dell#show running-config | grep cam
cam-acl l2acl 2 ipv4acl 3 ipv6acl 0 ipv4qos 2 l2qos 2 l2pt 0
ipmacacl 0 vman-qos 2 ecfmacl 0 ipv4pbr 2
Dell#

Dell#show cam-acl (Non-Default)

-- Chassis Cam ACL --
             Current Settings(in block sizes)
                   1 block = 128 entries
L2Acl        :         2
Ipv4Acl      :         3
Ipv6Acl      :         0
Ipv4Qos      :         2
L2Qos        :         2
L2PT         :         0
IpMacAcl     :         0
VmanQos      :         2
VmanDualQos  :         0
EcfmAcl      :         0
FcoeAcl      :         0
iscsiOptAcl  :         0
ipv4pbr      :         2
vrfv4Acl     :         0
Openflow     :         0
fedgovacl    :         0

-- stack-unit 0 --
           Current Settings(in block sizes)
                   1 block = 128 entries
L2Acl        :         2
Ipv4Acl      :         3
Ipv6Acl      :         0
Ipv4Qos      :         2
```

```
L2Qos         :         2
L2PT          :         0
IpMacAcl      :         0
VmanQos       :         2
VmanDualQos   :         0
EcfmAcl       :         0
FcoeAcl       :         0
iscsiOptAcl   :         0
ipv4pbr       :         2
vrfv4Acl      :         0
Openflow      :         0
fedgovacl     :         0
Dell#
```

test cam-usage

Verify that enough CAM space is available for the IPv6 ACLs you have created.

S6000

Syntax

`test cam-usage service-policy input input policy name linecard {number | all}`

Parameters

policy-map name	Enter the name of the policy-map to verify. Maximum is 32 characters.
number	Enter `all` to get information for all the linecards/stack-units or enter the linecard/ stack-unit number to get information for a specific card. The range is : 0-11 for S4810; 0-7 for all other S-Series

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced.

Usage Information

This command applies to both IPv4 and IPv6 CAM Profiles, but is best used when verifying QoS optimization for IPv6 ACLs.

QoS Optimization for IPv6 ACLs does not impact the CAM usage for applying a policy on a single (or the first of several) interfaces. It is most useful when a policy is applied across multiple interfaces; it can reduce the impact to CAM usage across subsequent interfaces.

The following describes the `test cam-usage` command shown in the following example.

Term	Explanation
Stack-Unit	Lists the stack unit or units that are checked. Entering all shows the status for all stacks.
Portpipe	Lists the portpipe (port-set) or port pipes (port-sets) that are checked. Entering `all` shows the status for linecards and port-pipes in the chassis.
CAM Partition	Shows the CAM profile of the CAM.
Available CAM	Identifies the amount of CAM space remaining for that profile.
Estimated CAM per Port	Estimates the amount of CAM space the listed policy will require.
Status	Indicates whether or not the policy will be allowed in the CAM.

Example (S-Series)

```
Dell#test cam-usage service-policy input In stack-unit all
Stack-Unit | Portpipe | CAM Partition | Available CAM |
Estimated CAM per Port| Status
---------------------------------------------------------------
-----------------------
0 | 0 | IPv4Flow | 102 | 0| Allowed
0 | 1 | IPv4Flow | 102 | 0| Allowed
Dell#
!
Dell#test cam-usage service-policy input In stack-unit 0 port-
set 1
Stack-Unit | Portpipe | CAM Partition | Available CAM |
Estimated CAM per Port| Status
---------------------------------------------------------------
------------------------
0 | 1 | IPv4Flow | 102 | 0| Allowed
Dell#
```

Usage Information

The following describes the `test cam-usage` command shown in the Example below.

Term	Explanation
Stack-Unit	Lists the stack unit or units that are checked. Entering `all` shows the status for all stacks.

Term	Explanation
Portpipe	Lists the portpipe (port-set) or port pipes (port-sets) that are checked. Entering `all` shows the status for linecards and port-pipes in the chassis.
CAM Partition	Shows the CAM profile of the CAM.
Available CAM	Identifies the amount of CAM space remaining for that profile.
Estimated CAM per Port	Estimates the amount of CAM space the listed policy will require.
Status	Indicates whether or not the policy will be allowed in the CAM.

Example (S-Series)

```
FTOS#test cam-usage service-policy input LauraIn stack-unit all

Stack-Unit|Portpipe|CAM Partition|AvailableCAM|EstimatedCAM
per Port|Status
---------------------------------------------------------------
---------
         0|       0|     IPv4Flow|
102|                    0|Allowed
         0|       1|     IPv4Flow|
102|                    0|Allowed
FTOS#
!
FTOS#test cam-usage service-policy input LauraIn stack-unit 0 port-
set 1

Stack-Unit|Portpipe|CAM Partition|Available CAM|EstimatedCAM
per Port|Status
---------------------------------------------------------------
-----------
         0|       1|     IPv4Flow|
102|                    0|Allowed
FTOS#
```

11

Control Plane Policing (CoPP)

The CoPP commands are supported on the Dell Networking S6000 platform.

control-plane-cpuqos

To manage control-plane traffic, enter control-plane mode and configure the switch.

S6000

Syntax	`control-plane-cpuqos`
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

service-policy rate-limit-cpu-queues

Apply a policy map for the system to rate limit control traffic on a per-queue basis.

S6000

Syntax	`service-policy rate-limit-cpu-queues` *`policy-name`*
Parameters	

policy-name	Enter the service-policy name, using a string up to 32 characters.

Defaults	Not configured.
Command Modes	CONTROL-PLANE-CPUQOS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Usage Information

Create a policy-map by associating a queue number with the qos-policy.

Create QoS policies prior to enabling this command.

For CoPP, use the keyword `cpu-qos` when creating qos-policy-input.

Related Commands

qos-policy-input — creates a QoS input policy map.

policy-map-input — creates an input policy map.

service-policy rate-limit-protocols

Apply a policy for the system to rate limit control protocols on a per-protocol basis.

S6000

Syntax

```
service-policy rate-limit-protocols policy-name
```

Parameters

policy-name	Enter the service-policy name, using a string up to 32 characters.

Defaults	Not configured.
Command Modes	CONTROL-PLANE-CPUQOS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Usage Information

This command applies the service-policy based on the type of protocol defined in the ACL rules.

Create ACL and QoS policies prior to enabling this command.

For CoPP, use the keyword `cpu-qos` when creating qos-policy-input.

Related Commands

ip access-list extended — creates an extended IP ACL.

mac access-list extended — creates an extended MAC ACL.

qos-policy-input — creates a QoS input policy map.

class-map — creates a QoS class map.

policy-map-input — creates an input policy map.

show cpu-queue rate cp

Display the rates for each CPU queue.

S6000

Syntax	`show cpu-queue rate cp`
Defaults	Not configured.
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.8.0	Introduced on the S4810.

Usage Information

This command applies the service-policy based on the type of protocol defined in the ACL rules.

Create ACL and QoS policies prior to enabling this command.

Example

```
Dell#show cpu-queue rate cp
 Service-Queue         Rate (PPS)      Burst ()
 --------------        -----------      -----------
Q0                        1300            512
Q1                        300             50
Q2                        300             50
Q3                        400             50
Q4                        2000            50
Q5                        300             50
Q6                        400             50
Q7                        400             50
Q8                        400             50
Q9                        600             50
Q10                       300             50
Q11                       300             50
```

show ip protocol-queue-mapping

Display the queue mapping for each configured protocol.

S6000

Syntax `show ip protocol-queue-mapping`

Defaults Not configured.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Example

```
Dell#show ip protocol-queue-mapping
 Protocol   Src-Port   Dst-Port   TcpFlag  Queue   EgPort
Rate (kbps)
```

```
 --------   --------   --------   -------  -----   ------
-----------
TCP (BGP)     any/179     179/any    _        Q9
_            _
UDP (DHCP)    67/68       68/67      _        Q10
_            _
UDP (DHCP-R)  67          67         _        Q10
_            _
TCP (FTP)     any         21         _        Q6
_            _
ICMP          any         any        _        Q6
_            _
IGMP          any         any        _        Q11
_            _
TCP (MSDP)    any/639     639/any    _        Q11
_            _
UDP (NTP)     any         123        _        Q6
_            _
OSPF          any         any        _        Q9
_            _
PIM           any         any        _        Q11
_            _
UDP (RIP)     any         520        _        Q9
_            _
TCP (SSH)     any         22         _        Q6
_            _
TCP (TELNET)  any         23         _        Q6
_            _
VRRP          any         any        _        Q10
_            _
Dell#
Dell#
Dell#
Dell#
Dell#
```

show ipv6 protocol-queue-mapping

Display the queue mapping for each configured IPv6 protocol.

S6000

Syntax	`show ipv6 protocol-queue-mapping`
Defaults	Not configured.
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Example

```
Dell#show ipv6 protocol-queue-mapping
 Protocol   Src-Port   Dst-Port   TcpFlag  Queue   EgPort
Rate (kbps)
 --------   --------   --------   -------  -----   ------
-----------
TCP (BGP)     any/179    179/any    _        Q9
_           _
ICMPV6 NA     any        any        _        Q6
_           _
ICMPV6 RA     any        any        _        Q6
_           _
ICMPV6 NS     any        any        _        Q5
_           _
ICMPV6 RS     any        any        _        Q5
_           _
ICMPV6        any        any        _        Q6
_           _
VRRPV6        any        any        _        Q10
_           _
OSPFV3        any        any        _        Q9
_           _
Dell#
Dell#
Dell#
```

show mac protocol-queue-mapping

Display the queue mapping for the MAC protocols.

S6000

Syntax	`show mac protocol-queue-mapping`
Defaults	Not configured.
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Example

```
Dell#show mac protocol-queue-mapping
 Protocol     Destination Mac       EtherType   Queue
EgPort     Rate (kbps)
 --------     ---------------       ---------   -----
------     -----------
ARP           any                   0x0806      Q5/
Q6           CP
FRRP          01:01:e8:00:00:10/11  any
Q7              CP
LACP          01:80:c2:00:00:02     0x8809
Q7              CP
LLDP          any                   0x88cc
Q8              CP
GVRP          01:80:c2:00:00:21     any
Q8              CP
STP           01:80:c2:00:00:00     any
Q7              CP
ISIS          01:80:c2:00:00:14/15  any
Q9              CP
              09:00:2b:00:00:04/05  any
Q9              CP
Dell#
```

12

Data Center Bridging (DCB)

Data center bridging (DCB) refers to a set of IEEE Ethernet enhancements that provide data centers with a single, robust, converged network to support multiple traffic types, including local area network (LAN), server, and storage traffic.

The Dell Networking operating software commands for data center bridging features include 802.1Qbb priority-based flow control (PFC), 802.1Qaz enhanced transmission selection (ETS), and the data center bridging exchange (DCBX) protocol.

This chapter includes the following sections:

- DCB Command
- PFC Commands
- ETS Commands
- DCBX Commands

DCB Command

The following DCB command is supported on the S6000 platform.

dcb-enable

Enable data center bridging.

S6000

Syntax	`dcb enable[`*`pfc-queues 1|4`*`]` To disable DCB, use the `no dcb enable` command.
Parameters	*pfc-queues* — Enter the pfc-queue range. To disable DCB, use the no dcb enable command. The range is from 1 or 2.
Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

By default, iSCSI is enabled on the unit and flow control is enabled on all of the interfaces or if link-level flow control is enabled on one or more interfaces. To enable DCB, do one of the following:

- Apply the `dcb-input policy` command with the `no pfc-mode` command on to all the interfaces.
- Disable flow-control on all of the interfaces.

Related Commands

dcb-policy input — applies the input policy with the PFC configuration to an ingress interface.

PFC Commands

The following PFC commands are supported on the S6000 platform.

clear pfc counters

Clear the PFC TLV counters and PFC statistics on an interface or stack unit.

S6000

Syntax

```
clear pfc counters [port-type slot/port | stack-unit {unit
number | all } all stack-ports all}]
```

Parameters

port-type	Enter the keywords `port-type` then the slot/port information.
stack-unit *unit number*	Enter the keywords `stack-unit` then the stack-unit number to be cleared.
all stack-ports all	Enter the keywords `all stack-ports all` to clear the counters on all interfaces.

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information	If you do not use the `statistics` parameter, both hardware and DCBx counters clear.

dcb-input

To apply pause or flow control for specified priorities using a configure delay time, create a DCB input policy.

S6000

Syntax

`dcb-input policy-name`

To delete the DCB input policy, use the `no dcb-input` command.

Parameters

policy-name	Maximum: 32 alphanumeric characters.

Defaults	none
Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information	NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future. As soon as you apply a DCB policy with PFC enabled on an interface, DCBx starts exchanging information with PFC-enabled peers. The IEEE802.1Qbb, CEE, and CIN versions of PFC TLV are supported. DCBx also validates PFC configurations received in TLVs from peer devices. By applying a DCB input policy with PFC enabled, you enable PFC operation on ingress port traffic. To achieve complete lossless handling of traffic, also enable PFC on all DCB egress ports or configure the dot1p priority-queue assignment of PFC priorities to lossless queues (refer to `pfc no-drop queues`). To remove a DCB input policy, including the PFC configuration it contains, enter the `no dcb-input policy-name` command in Interface Configuration mode.
Related Commands	dcb-policy input — applies the input policy with the PFC configuration.

dcb-policy input

Apply the input policy with the PFC configuration to an ingress interface.

S6000

Syntax	`dcb-policy input policy-name` To delete the input policy, use the `no dcb-policy input` command.
Parameters	*policy-name* — Enter the input policy name with the PFC configuration to an ingress interface.
Defaults	none
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

If you apply an input policy with PFC disabled (`no pfc mode on`):

- You can enable link-level flow control on the interface. To delete the input policy, first disable link-level flow control. PFC is then automatically enabled on the interface because an interface is by default PFC-enabled.
- PFC still allows you to configure lossless queues on a port to ensure no-drop handling of lossless traffic.

When you apply an input policy to an interface, an error message is displayed if:

- The PFC dot1p priorities result in more than two lossless port queues globally on the switch.
- You already enabled link-level flow control. PFC and link-level flow control cannot be enabled at the same time on an interface.

In a switch stack, configure all stacked ports with the same PFC configuration.

A DCB input policy for PFC applied to an interface may become invalid if you reconfigure the dot1p-queue mapping. This situation occurs when the new dot1p-queue assignment exceeds the maximum number (2) of lossless queues supported globally on the switch. In this case, all PFC configurations received from PFC-enabled peers are removed and resynchronized with the peer devices.

Traffic may be interrupted when you reconfigure PFC no-drop priorities in an input policy or reapply the policy to an interface.

If the priority group to QoS policy mapping configurations in the DCB output profile are not complete (for example, no priorities are mapped or only some of the priorities are mapped), all eight priorities map to a single priority group with a PGID of 0 for DCBx negotiations.

Related Commands

dcb-input — creates a DCB input policy.

dcb-policy input stack-unit stack-ports all

Apply the specified DCB input policy on all ports of the switch stack or a single stacked switch.

S6000

Syntax

```
dcb-policy input stack-unit {all | stack-unit-id} stack-ports
all dcb-input-policy-name
```

To remove all DCB input policies applied to the stacked ports and rest the PFC to its default settings, use the `no dcb-policy input stack-unit all` command.

To remove only the DCB input policies applied to the specified switch, use the `no dcb-policy input stack-unit` command.

Parameters

stack-unit-id	Enter the stack unit identification.
dcb-input-policy-name	Enter the policy name for the DCB input policy.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

The `dcb-policy input stack-unit all` command overwrites any previous `dcb-policy input stack-unit stack-unit-id` configurations. Similarly, a `dcb-policy input stack-unit stack-unit-id` command overwrites any previous `dcb-policy input stack-unit all` configuration.

pfc no-drop queues

Configure the port queues that still function as no-drop queues for lossless traffic.

S6000

Syntax

`pfc no-drop queues` *`queue-range`*

To remove the no-drop port queues, use the `no pfc no-drop queues` command.

Parameters

queue-range	Enter the queue range. Separate the queue values with a comma; specify a priority range with a dash; for example,

`pfc no-drop queues 1,3` or `pfc no-drop queues 7` or `pfc no-drop queues 0,7`. The range is from 0 to 3.

Defaults	No lossless queues are configured.
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

- When you configure lossless queues on an interface, PFC priority configuration is not allowed on the dcb-input profile applied on the interface.
- The maximum number of lossless queues globally supported on the switch is two.

  The following lists the dot1p priority-queue assignments.

dot1p Value in the Incoming Frame	Description heading
0	0
1	0
2	0
3	1
4	2
5	3
6	3
7	3

pfc priority

Configure the CoS traffic to be stopped for the specified delay.

S6000

Syntax

`pfc priority *priority-range*`

To delete the pfc priority configuration, use the `no pfc priority` command.

Parameters

priority-range	Enter the 802.1p values of the frames to be paused. Separate the priority values with a comma; specify a priority range with a dash; for example, pfc priority 1,3,5-7. The range is from 0 to 7.

Defaults

none

Command Modes

DCB INPUT POLICY

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

You can enable any number of 802.1p priorities for PFC. Queues to which PFC priority traffic is mapped are lossless by default. Traffic may be interrupted due to an interface flap (going down and coming up) when you reconfigure the lossless queues for no-drop priorities in a PFC input policy and reapply the policy to an interface.

The maximum number of lossless queues supported on the switch is two.

A PFC peer must support the configured priority traffic (as DCBX detects) to apply PFC.

Related Commands	dcb-input — creates a DCB input policy.

show dcb

Displays the data center bridging status, the number of PFC-enabled ports, and the number of PFC-enabled queues.

S6000

Syntax

```
show dcb [stack-unit unit-number] [port-set port-set port-set
number]
```

Parameters

unit number	Enter the DCB unit number. The range is from 0 to 5.
port-set number	Enter the port-set number.

Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information	Specify a stack-unit number on the Master switch in a stack.

Example

```
Dell# show dcb
stack-unit 0 port-set 0
      DCB Status : Enabled
    PFC Port Count : 56 (current), 56 (configured)
PFC Queue Count : 2 (current), 2 (configured)
```

show interface pfc

Displays the PFC configuration applied to ingress traffic on an interface, including priorities and link delay.

S6000

Syntax

```
show interface port-type slot/port pfc {summary | detail}
```

Parameters

port-type slot/ port pfc	Enter the port-type slot and port PFC information.
{summary | detail}	Enter the keyword `summary` for a summary list of results or enter the keyword `detail` for a full list of results.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2.(0.0)	Down status messages added.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To clear the PFC TLV counters, use the `clear pfc counters interface` *`port-type slot/port`* command.

The following describes the `show interface pfc summary` command shown in the following example.

Field	Description
Interface	Interface type with stack-unit and port number.
Admin mode is on Admin is enabled	PFC admin mode is on or off with a list of the configured PFC priorities. When the PFC admin mode is on, PFC advertisements are enabled to be sent and received from peers; received PFC configuration take effect. The admin operational status for a DCBX exchange of PFC configuration is enabled or disabled.
Remote is enabled, Priority list Remote Willing Status is enabled	Operational status (enabled or disabled) of peer device for DCBX exchange of PFC configuration with a list of the configured PFC priorities. Willing status of peer device for DCBX exchange (Willing bit received in PFC TLV): enabled or disable.
Local is enabled	DCBX operational status (enabled or disabled) with a list of the configured PFC priorities.

Field	Description
Operational status (local port)	Port state for current operational PFC configuration: - `Init`: Local PFC configuration parameters were exchanged with the peer. - `Recommend`: Remote PFC configuration parameters were received from the peer. - `Internally propagated`: PFC configuration parameters were received from the configuration source.
PFC DCBX Oper status	Operational status for the exchange of the PFC configuration on the local port: match (up) or mismatch (down).
State Machine Type	Type of state machine used for DCBX exchanges of the PFC parameters: Feature — for legacy DCBX versions; Symmetric — for an IEEE version.
TLV Tx Status	Status of the PFC TLV advertisements: enabled or disabled.
PFC Link Delay	Link delay (in quanta) used to pause specified priority traffic.
Application Priority TLV: FCOE TLV Tx Status	Status of FCoE advertisements in application priority TLVs from the local DCBX port: enabled or disabled.
Application Priority TLV: SCSI TLV Tx Status	Status of ISCSI advertisements in application priority TLVs from the local DCBX port: enabled or disabled.
Application Priority TLV: Local FCOE Priority Map	Priority bitmap the local DCBX port uses in FCoE advertisements in application priority TLVs.
Application Priority TLV: Local ISCSI Priority Map	Priority bitmap the local DCBX port uses in ISCSI advertisements in application priority TLVs.
Application Priority TLV: Remote FCOE Priority Map	Status of FCoE advertisements in application priority TLVs from the remote peer port: enabled or disabled.
Application Priority TLV: Remote ISCSI Priority Map	Status of iSCSI advertisements in application priority TLVs from the remote peer port: enabled or disabled.
PFC TLV Statistics: Input TLV pkts	Number of PFC TLVs received.
PFC TLV Statistics: Output TLV pkts	Number of PFC TLVs transmitted.

Field	Description
PFC TLV Statistics: Error pkts	Number of PFC error packets received.
PFC TLV Statistics: Pause Tx pkts	Number of PFC pause frames transmitted.
PFC TLV Statistics: Pause Rx pkts	Number of PFC pause frames received.

Example (Summary)

```
Dell# show interfaces tengigabitethernet 0/49 pfc summary
Interface TenGigabitEthernet 0/49
  Admin mode is on
  Admin is enabled
  Remote is enabled, Priority list is 4
  Remote Willing Status is enabled
  Local is enabled
  Oper status is Recommended
  PFC DCBX Oper status is Up
  State Machine Type is Feature
  TLV Tx Status is enabled
  PFC Link Delay 45556 pause quantams
  Application Priority TLV Parameters :
  --------------------------------------
  FCOE TLV Tx Status is disabled
  ISCSI TLV Tx Status is disabled
  Local FCOE PriorityMap is 0x8
  Local ISCSI PriorityMap is 0x10
  Remote FCOE PriorityMap is 0x8
  Remote ISCSI PriorityMap is 0x8

Dell# show interfaces tengigabitethernet 0/49 pfc detail
  Interface TenGigabitEthernet 0/49
  Admin mode is on
  Admin is enabled
  Remote is enabled
  Remote Willing Status is enabled
  Local is enabled
  Oper status is recommended
  PFC DCBX Oper status is Up
  State Machine Type is Feature
  TLV Tx Status is enabled
  PFC Link Delay 45556 pause quanta
  Application Priority TLV Parameters :
  --------------------------------------
  FCOE TLV Tx Status is disabled
  ISCSI TLV Tx Status is disabled
  Local FCOE PriorityMap is 0x8
  Local ISCSI PriorityMap is 0x10
  Remote FCOE PriorityMap is 0x8
  Remote ISCSI PriorityMap is 0x8
  0 Input TLV pkts, 1 Output TLV pkts, 0 Error pkts,
  0 Pause Tx pkts, 0 Pause Rx pkts
```

show interface pfc statistics

Displays counters for the PFC frames received and transmitted (by dot1p priority class) on an interface.

S6000

Syntax `show interface port-type slot/port pfc statistics`

Parameters

port-type	Enter the port type.
slot/port	Enter the slot/port number.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Example (Summary)

```
Dell (conf-if-te-0/1)#show int te 0/1 pfc statistics
Interface TenGigabitEthernet 0/1
Priority            Rx XOFF Frames                  Rx Total
Frames             Tx Total Frames
---------------------------------------------------------------
-----------------------
-
0                       0
0                           0
1                       0
0                           0
2                       0
0                           0
3                       0
0                           0
4                       0
0                           0
5                       0
0                           0
6                       0
0                           0
7                       0
0                           0
```

ETS Commands

The following ETS commands are supported on the S6000 platform.

dcb-enable

Enable data center bridging.

S6000

Syntax	`dcb enable[pfc-queues 1|4]` To disable DCB, use the `no dcb enable` command.
Parameters	*pfc-queues* — Enter the pfc-queue range. To disable DCB, use the no dcb enable command. The range is from 1 or 2.
Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

By default, iSCSI is enabled on the unit and flow control is enabled on all of the interfaces or if link-level flow control is enabled on one or more interfaces. To enable DCB, do one of the following:

- Apply the `dcb-input policy` command with the `no pfc-mode` command on to all the interfaces.
- Disable flow-control on all of the interfaces.

Related Commands

dcb-policy input — applies the input policy with the PFC configuration to an ingress interface.

dcb-output

To associate an ETS configuration with priority traffic, create a DCB output policy.

S6000

Syntax

`dcb-output policy-name`

To remove the ETS output policy globally, use the `no dcb output policy-name` command.

Parameters

policy-name	Enter the DCB output policy name. The maximum is 32 alphanumeric characters.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

To associate a priority group with an ETS output policy with scheduling and bandwidth configuration, create a DCB output policy. You can apply a DCB output policy on multiple egress ports. When you apply an ETS output policy on an interface, ETS-configured scheduling and bandwidth allocation take precedence over any configured settings in QoS output policies.

The ETS configuration associated with 802.1 priority traffic in a DCB output policy is used in DCBX negotiation with ETS peers.

Related Commands

dcb-policy output — applies the output policy.

dcb-policy output

Apply the output policy with the ETS configuration to an egress interface.

S6000

Syntax	`dcb-policy output` *`policy-name`* To delete the output policy, use the `no dcb-policy output` command.
Parameters	*policy-name* — Enter the output policy name.
Defaults	none
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

NOTE: Please note that Dell Networking does not recommended to use this command as it has been deprecated in the current 9.4.(0.0) release. A warning message appears when you try to run this command indicating that you have to use the dcb-map commands in the future.

When you apply an ETS output policy to on interface, ETS-configured scheduling and bandwidth allocation take precedence over any configured settings in QoS output policies.

When you disable DCB, ETS is disabled by default. When you enable DCB, ETS is enabled for all interfaces that have the default ETS configuration applied (all dot1p priorities in the same group with equal bandwidth allocation).

Related Commands

dcb-output — creates a DCB output policy.

clear ets counters

Clear all ETS TLV counters on an interface.

S6000

Syntax	`clear ets counters port-type slot/port`
Parameters	

port-type	Enter the keywords `port-type` then the slot/port information.

Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

show interface ets

Displays the ETS configuration applied to egress traffic on an interface, including priority groups with priorities and bandwidth allocation.

S6000

Syntax	show interface *port-type slot/port* ets {summary | detail}
Parameters	

port-type slot/ port ets	Enter the port-type slot and port ETS information.
{summary | detail}	Enter the keyword `summary` for a summary list of results or enter the keyword `detail` for a full list of results.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.2)	Down status messages added.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Example (Summary)

```
Dell(conf-qos-policy-out-ets)#show interface te 0/3 ets de

Interface TenGigabitEthernet 0/3
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on

Admin Parameters :
------------------
Admin is enabled

TC-grp Priority#   Bandwidth  TSA
------------------------------------------------
0                  -          -
1      0,1,2       100%       ETS
2      3           0 %        SP
3      4,5,6,7     0 %        SP
4                  -          -
5                  -          -
6                  -          -
7                  -          -

Remote Parameters :
-------------------
Remote is disabled

Local Parameters :
------------------
Local is enabled

TC-grp Priority#   Bandwidth TSA
------------------------------------------------
0                  -         -
1      0,1,2       100%      ETS
2      3           0 %       SP
3      4,5,6,7     0 %       SP
4                  -         -
5                  -         -
6                  -         -
7                  -         -

Oper status is init
ETS DCBX Oper status is Down
State Machine Type is Asymmetric
Conf TLV Tx Status is enabled
Reco TLV Tx Status is enabled
```

```
0 Input Conf TLV Pkts, 1955 Output Conf TLV Pkts, 0 Error Conf
TLV Pkts
0 Input Reco TLV Pkts, 1955 Output Reco TLV Pkts, 0 Error Reco
TLV Pkts

Dell(conf-qos-policy-out-ets)#do sho int te 0/3 ets de

Interface TenGigabitEthernet 0/3
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on

Admin Parameters :
------------------
Admin is enabled

TC-grp Priority#   Bandwidth TSA
------------------------------------------------
0                  -         -
1      0,1,2       100%      ETS
2      3           0 %       SP
3      4,5,6,7     0 %       SP
4                  -         -
5                  -         -
6                  -         -
7                  -         -

Remote Parameters :
-------------------
Remote is disabled

Local Parameters :
------------------
Local is enabled

TC-grp Priority#   Bandwidth TSA
------------------------------------------------
0                  -         -
1      0,1,2       100%      ETS
2      3           0 %       SP
3      4,5,6,7     0 %       SP
4                  -         -
5                  -         -
6                  -         -
7                  -         -

Oper status is init
ETS DCBX Oper status is Down
State Machine Type is Asymmetric
Conf TLV Tx Status is enabled
Reco TLV Tx Status is enabled

0 Input Conf TLV Pkts, 1955 Output Conf TLV Pkts, 0 Error Conf
TLV Pkts
0 Input Reco TLV Pkts, 1955 Output Reco TLV Pkts, 0 Error Reco
TLV Pkts

Dell(conf)# show interfaces tengigabitethernet 0/0 ets detail
Interface TenGigabitEthernet 0/0
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on
Admin Parameters :
------------------
```

```
Admin is enabled
TC-grp Priority# Bandwidth TSA
0 0,1,2,3,4,5,6,7 100% ETS
1 0% ETS
2 0% ETS
3 0% ETS
4 0% ETS
5 0% ETS
6 0% ETS
7 0% ETS
Priority# Bandwidth TSA
0 13% ETS
1 13% ETS
2 13% ETS
3 13% ETS
4 12% ETS
5 12% ETS
6 12% ETS
7 12% ETS
Remote Parameters:
-------------------
Remote is disabled
Local Parameters :
------------------
Local is enabled
TC-grp Priority# Bandwidth TSA
0 0,1,2,3,4,5,6,7 100% ETS
1 0% ETS
2 0% ETS
3 0% ETS
4 0% ETS
5 0% ETS
6 0% ETS
7 0% ETS
Priority# Bandwidth TSA
0 13% ETS
1 13% ETS
2 13% ETS
3 13% ETS
4 12% ETS
5 12% ETS
6 12% ETS
7 12% ETS
Oper status is init
Conf TLV Tx Status is disabled
Traffic Class TLV Tx Status is disabled
0 Input Conf TLV Pkts, 0 Output Conf TLV Pkts, 0 Error Conf
TLV Pkts
0T LIVnput Traffic Class TLV Pkts, 0 Output Traffic Class TLV
Pkts, 0 Error Traffic
Class
Pkts
```

Example (Detail)

```
Dell(conf)# show interfaces tengigabitethernet 0/0 ets detail
Interface TenGigabitEthernet 0/0
Max Supported TC Groups is 4
Number of Traffic Classes is 8
Admin mode is on
Admin Parameters :
------------------
Admin is enabled
TC-grp Priority#        Bandwidth TSA
0      0,1,2,3,4,5,6,7  100%      ETS
```

```
1                      0%        ETS
2                      0%        ETS
3                      0%        ETS
4                      0%        ETS
5                      0%        ETS
6                      0%        ETS
7                      0%        ETS

Priority#              Bandwidth TSA
0                      13%       ETS
1                      13%       ETS
2                      13%       ETS
3                      13%       ETS
4                      12%       ETS
5                      12%       ETS
6                      12%       ETS
7                      12%       ETS
Remote Parameters:
-------------------
Remote is disabled

Local Parameters :
------------------
Local is enabled
TC-grp Priority#       Bandwidth TSA
0      0,1,2,3,4,5,6,7  100%      ETS
1                      0%        ETS
2                      0%        ETS
3                      0%        ETS
4                      0%        ETS
5                      0%        ETS
6                      0%        ETS
7                      0%        ETS

Priority#              Bandwidth TSA
0                      13%       ETS
1                      13%       ETS
2                      13%       ETS
3                      13%       ETS
4                      12%       ETS
5                      12%       ETS
6                      12%       ETS
7                      12%       ETS
Oper status is init
Conf TLV Tx Status is disabled
Traffic Class TLV Tx Status is disabled
0 Input Conf TLV Pkts, 0 Output Conf TLV Pkts, 0 Error Conf
TLV Pkts
0 Input Traffic Class TLV Pkts, 0 Output Traffic Class TLV
Pkts, 0 Error Traffic Class
TLV
Pkts
```

DCBX Commands

The following DCBX commands are supported on the S6000 platform.

advertise dcbx-tlv

On a DCBX port with a manual role, configure the PFC and ETS TLVs advertised to DCBX peers.

S6000

Syntax

`advertise dcbx-tlv {ets-conf | ets-reco | pfc} [ets-conf | ets-reco | pfc] [ets-conf | ets-reco | pfc]`

To remove the advertised ETS TLVs, use the `no advertise dcbx-tlv` command.

Parameters

{ets-conf | ets-reco | pfc}	Enter the PFC and ETS TLVs advertised, where: • `ets-conf`: enables the advertisement of ETS configuration TLVs. • `ets-reco`: enables the advertisement of ETS recommend TLVs. • `pfc`: enables the advertisement of PFC TLVs.

Defaults

All PFC and ETS TLVs are advertised.

Command Modes

PROTOCOL LLDP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

You can configure the transmission of more than one TLV type at a time; for example: `advertise dcbx-tlv ets-conf ets-reco`.

You can enable ETS recommend TLVs (`ets-reco`) only if you enable ETS configuration TLVs (`ets-conf`). To disable TLV transmission, use the `no` form of the command; for example, `no advertise dcbx-tlv pfc ets-reco`.

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

dcbx port-role

Configure the DCBX port role the interface uses to exchange DCB information.

S6000

Syntax	`dcbx port-role {config-source | auto-downstream | auto-upstream | manual}` To remove DCBX port role, use the `no dcbx port-role {config-source | auto-downstream | auto-upstream | manual}` command.
Parameters	

config-source | auto-downstream | auto-upstream | manual	Enter the DCBX port role, where: • `config-source`: configures the port to serve as the configuration source on the switch. • `auto-upstream`: configures the port to receive a peer configuration. The configuration source is elected from auto-upstream ports. • `auto-downstream`: configures the port to accept the internally propagated DCB configuration from a configuration source. • `manual`: configures the port to operate only on administer-configured DCB parameters. The port does not accept a DCB configuration received form a peer or a local configuration source.

Defaults	**Manual**
Command Modes	INTERFACE PROTOCOL LLDP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

dcbx version

Configure the DCBX version used on the interface.

S6000

Syntax

`dcbx version {auto | cee | cin | ieee-v2.5}`

To remove the DCBX version, use the `dcbx version {auto | cee | cin | ieee-v2.5}` command.

Parameters

auto | cee | cin | ieee-v2.5	Enter the DCBX version type used on the interface, where: • `auto`: configures the port to operate using the DCBX version received from a peer. • `cee`: configures the port to use CDD (Intel 1.01). • `cin`: configures the port to use Cisco-Intel-Nuova (DCBX 1.0). • `ieee-v2`: configures the port to use IEEE 802.1az (Draft 2.5).

Defaults

Auto

Command Modes

INTERFACE PROTOCOL LLDP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

DCBX requires that you enable LLDP to advertise DCBX TLVs to peers.

Configure DCBX operation at the INTERFACE level on a switch or globally on the switch. To verify the DCBX configuration on a port, use the `show interface dcbx detail` command.

debug dcbx

Enable DCBX debugging.

S6000

Syntax	`debug dcbx {all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv}` To disable DCBX debugging, use the `no debug dcbx` command.

Parameters

{all | auto-detect-timer | config-exchng | fail | mgmt | resource | sem | tlv}	Enter the type of debugging, where: • `all`: enables all DCBX debugging operations. • `auto-detect-timer`: enables traces for DCBX auto-detect timers. • `config-exchng`: enables traces for DCBX configuration exchanges. • `fail`: enables traces for DCBX failures. • `mgmt`: enables traces for DCBX management frames. • `resource`: enables traces for DCBX system resource frames. • `sem`: enables traces for the DCBX state machine. • `tlv`: enables traces for DCBX TLVs.

Defaults	none
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

fcoe priority-bits

Configure the FCoE priority advertised for the FCoE protocol in application priority TLVs.

S6000

Syntax	`fcoe priority-bits` *`priority-bitmap`* To remove the configured FCoE priority, use the `no fcoe priority-bits` command.
Parameters	*priority-bitmap* — Enter the priority-bitmap range. The range is from 1 to FF.
Defaults	0x8
Command Modes	PROTOCOL LLDP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information	This command is available at the global level only.

iscsi priority-bits

Configure the iSCSI priority advertised for the iSCSI protocol in application priority TLVs.

S6000

Syntax	`iscsi priority-bits` *`priority-bitmap`* To remove the configured iSCSI priority, use the `no iscsi priority-bits` command.
Parameters	*priority-bitmap* — Enter the priority-bitmap range. The range is from 1 to FF.
Defaults	0x10

Command Modes	PROTOCOL LLDP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information	This command is available at the global level only.

show interface dcbx detail

Displays the DCBX configuration on an interface.

S6000

Syntax `show interface port-type slot/port dcbx detail`

Parameters

port-type	Enter the port type.
slot/port	Enter the slot/port number.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2.(0.0)	Down status messages added.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 8.3.16.0	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To clear DCBX frame counters, use the `clear dcbx counters interface` *`stack-unit/port`* command.

The following describes the `show interface dcbx detail` command shown in the following example.

Field	Description
Interface	Interface type with chassis slot and port number.
Port-Role	Configured the DCBX port role: auto-upstream, auto-downstream, config-source, or manual.
DCBX Operational Status	Operational status (enabled or disabled) used to elect a configuration source and internally propagate a DCB configuration. The DCBX operational status is the combination of PFC and ETS operational status.
Configuration Source	Specifies whether the port serves as the DCBX configuration source on the switch: true (yes) or false (no).
Local DCBX Compatibility mode	DCBX version accepted in a DCB configuration as compatible. In auto-upstream mode, a port can only receive a DCBX version supported on the remote peer.
Local DCBX Configured mode	DCBX version configured on the port: CEE, CIN, IEEE v2.5, or Auto (port auto-configures to use the DCBX version received from a peer).
Peer Operating version	DCBX version that the peer uses to exchange DCB parameters.
Local DCBX TLVs Transmitted	Transmission status (enabled or disabled) of advertised DCB TLVs (see TLV code at the top of the show command output).
Local DCBX Status: DCBX Operational Version	DCBX version advertised in Control TLVs.
Local DCBX Status: DCBX Max Version Supported	Highest DCBX version supported in Control TLVs.
Local DCBX Status: Sequence Number	Sequence number transmitted in Control TLVs.
Local DCBX Status: Acknowledgment Number	Acknowledgement number transmitted in Control TLVs.

Field	Description
Local DCBX Status: Protocol State	Current operational state of the DCBX protocol: ACK or IN-SYNC.
Peer DCBX Status: DCBX Operational Version	DCBX version advertised in Control TLVs received from the peer device.
Peer DCBX Status: DCBX Max Version Supported	Highest DCBX version supported in Control TLVs received from the peer device.
Peer DCBX Status: Sequence Number	Sequence number transmitted in Control TLVs received from the peer device.
Peer DCBX Status: Acknowledgment Number	Acknowledgement number transmitted in Control TLVs received from the peer device.
Total DCBX Frames transmitted	Number of DCBX frames sent from the local port.
Total DCBX Frames received	Number of DCBX frames received from the remote peer port.
Total DCBX Frame errors	Number of DCBX frames with errors received.
Total DCBX Frames unrecognized	Number of unrecognizable DCBX frames received.

Example

```
Dell(conf)# show interface tengigabitethernet 0/49 dcbx detail
Dell#show interface te 0/49 dcbx detail

E-ETS Configuration TLV enabled
  e-ETS Configuration TLV disabled
R-ETS Recommendation TLV enabled
  r-ETS Recommendation TLV disabled
P-PFC Configuration TLV enabled
  p-PFC Configuration TLV disabled
F-Application priority for FCOE enabled
  f-Application Priority for FCOE disabled
I-Application priority for iSCSI enabled
  i-Application Priority for iSCSI disabled
-----------------------------------------------------------

Interface TenGigabitEthernet 0/49
  Remote Mac Address 00:00:00:00:00:11
   Port Role is Auto-Upstream
  DCBX Operational Status is Enabled
  Is Configuration Source? TRUE

Local DCBX Compatibility mode is CEE
  Local DCBX Configured mode is CEE
  Peer Operating version is CEE
  Local DCBX TLVs Transmitted: ErPfi

Local DCBX Status
-----------------
  DCBX Operational Version is 0
  DCBX Max Version Supported is 0
  Sequence Number: 2
  Acknowledgment Number: 2
  Protocol State: In-Sync

Peer DCBX Status:
----------------
  DCBX Operational Version is 0
  DCBX Max Version Supported is 255
  Sequence Number: 2
  Acknowledgment Number: 2
  Total DCBX Frames transmitted 27
  Total DCBX Frames received 6
  Total DCBX Frame errors 0
  Total DCBX Frames unrecognized 0
```

dcb-map

Create a DCB map to configure priority flow control (PFC) and enhanced transmission selection (ETS) on Ethernet ports that support converged Ethernet traffic. Apply the DCB map to an Ethernet interface.

S6000

Syntax `dcb-map` *`map-name`*

Parameters

map-name	Enter a DCB map name. The maximum number of alphanumeric characters is 32.

Defaults None. There are no pre-configured PFC and ETS settings on S5000 Ethernet interfaces.

Command Modes

CONFIGURATION

INTERFACE

Command History

Version 9.3(0.0)	Introduced on the S4810 and S6000 platforms.

Usage Information

A DCB map is a template used to configure DCB parameters and apply them on converged Ethernet interfaces. DCB parameters include priority-based flow control (PFC) and enhanced traffic selection (ETS).

To display the PFC and ETS settings in DCB maps, enter the `show qos dcb-map` command.

Use the `dcb-map` command to create a DCB map to specify PFC and ETS settings and apply it on Ethernet ports. After you apply a DCB map to an interface, the PFC and ETS settings in the map are applied when the Ethernet port is enabled. DCBx is enabled on Ethernet ports by default.

The `dcb-map` command is supported only on physical Ethernet interfaces.

To remove a DCB map from an interface, enter the `no dcb-map` *`map-name`* command in Interface configuration mode.

priority-pgid

Assign 802.1p priority traffic to a priority group in a DCB map.

S6000

Syntax

```
priority-pgid dot1p0_group-num dot1p1_group-num dot1p2_group-num dot1p3_group-num dot1p4_group-num dot1p5_group-num dot1p6_group-num dot1p7_group-num
```

Parameters

dot1p0_group-num	Enter the priority group number for each 802.1p class of traffic in a DCB map.
dot1p1_group-num	
dot1p2_group-num	
dot1p3_group-num	
dot1p4_group-num	
dot1p5_group-num	
dot1p6_group-num	
dot1p7_group-num	

Defaults None

Command Modes DCB MAP

Command History

Version 9.3(0.0)	Introduced on the S4810, S6000 platforms.

Usage Information	PFC and ETS settings are not pre-configured on Ethernet ports. You must use the `dcb-map` command to configure different groups of 802.1p priorities with PFC and ETS settings.

Using the `priority-pgid` command, you assign each 802.1p priority to one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group. For example, the `priority-pgid 0 0 0 1 2 4 4 4` command creates the following groups of 802.1p priority traffic:

- Priority group 0 contains traffic with dot1p priorities 0, 1, and 2.
- Priority group 1 contains traffic with dot1p priority 3.
- Priority group 2 contains traffic with dot1p priority 4.
- Priority group 4 contains traffic with dot1p priority 5, 6, and 7.

To remove a priority-pgid configuration from a DCB map, enter the `no priority-pgid` command.

priority-group bandwidth pfc

Configure the ETS bandwidth allocation and PFC mode used to manage port traffic in an 802.1p priority group.

S6000

Syntax

```
priority-group group-num {bandwidth percentage| strict-
priority} pfc {on | off}
```

Parameters

priority-group *group-num*	Enter the keyword `priority-group` followed by the number of an 802.1p priority group. Use the `priority-pgid` command to create the priority groups in a DCB map.
bandwidth *percentage*	Enter the keyword `bandwidth` followed by a bandwidth percentage allocated to the priority group. The range of valid values is 1 to 100. The sum of all allocated bandwidth percentages in priority groups in a DCB map must be 100%.
strict-priority	Configure the priority-group traffic to be handled with strict priority scheduling. Strict-priority traffic is serviced first, before bandwidth allocated to other priority groups is made available.
pfc {on | off}	Configure whether priority-based flow control is enabled (on) or disabled (off) for port traffic in the priority group.

Defaults None

Command Modes	DCB MAP
Command History	**Version 9.3(0.0)** Introduced on the S4810, S6000 platforms.

Usage Information

Use the `dcb-map` command to configure priority groups with PFC and/or ETS settings and apply them to Ethernet interfaces.

Use the `priority-pgid` command to map 802.1p priorities to a priority group. You can assign each 802.1p priority to only one priority group. A priority group consists of 802.1p priority values that are grouped together for similar bandwidth allocation and scheduling, and that share latency and loss requirements. All 802.1p priorities mapped to the same queue must be in the same priority group.

Repeat the `priority-group bandwidth pfc` command to configure PFC and ETS traffic handling for each priority group in a DCB map.

You can enable PFC on a maximum of two priority queues.

If you configure more than one priority group as strict priority, the higher numbered priority queue is given preference when scheduling data traffic.

If a priority group does not use its allocated bandwidth, the unused bandwidth is made available to other priority groups.

To remove a priority-group configuration in a DCB map, enter the `no priority-group bandwidth pfc` command.

By default, equal bandwidth is assigned to each dot1p priority in a priority group. Use the `bandwidth` parameter to configure the bandwidth percentage assigned to a priority group. The sum of the bandwidth allocated to all priority groups in a DCB map must be 100% of the bandwidth on the link. You must allocate at least 1% of the total port bandwidth to each priority group.

dcb-map stack-unit all stack-ports all

Apply the specified DCB map on all ports of the switch stack.

S6000

Syntax

```
dcb-map stack-unit all stack-ports all dcb-map-name
```

To remove the PFC and ETS settings in a DCB map from all stack units, use the `no dcb-map stack-unit all stack-ports all` command.

Parameters

dcb-map-name	Enter the name of the DCB map.

Defaults	None
Command Modes	CONFIGURATION
Command History	**Version 9.3(0.0)** Introduced on the S4810 and S6000 platforms.
Usage Information	The `dcb-map stack-unit all stack-ports all` command overwrites any previous DCB maps applied to stack ports.

dcb pfc-shared-buffer-size

Configure the maximum amount of shared buffer size for PFC packets in kilobytes. This utility is supported on the S6000 platform.

You must configure the shared buffer size to be less than the total PFC buffer size. If the buffer size and DCB buffer threshold settings are applied on one or more ports, a validaiton is performed to determine whether following condition is satisfied: Shared-pfc-buffer-size <= (Total-pfc-buffer-size - Σpfc priority <> buffer-size on each port, priority).

If the preceding condition is not satisfied by the shared PFC buffer size value, the configuration is not saved and a system logging message is generated stating that the shared buffer size that you attempt to specify cannot be configured because of the existing total buffer space on the system being lower than the shared buffer size. You must either enter a smaller value for the shared buffer size or increase the total buffer size appropriately by using the `dcb pfc-total- buffer-size` command.

Syntax	`dcb pfc-shared—buffer—size` *`KB`*
Parameters	*KB* Enter a number in the range of 0 to 7787.
Default	The default is 1 KB for S6000 platforms.
Command Modes	CONFIGURATION mode
Command History	**Version 9.3(0.0)** Introduced on the S4810, S4820T, and S6000 platforms.
Usage Information	Configure the maximum shared buffer available for PFC traffic. You can choose to increase or decrease the shared buffer that is currently allocated in the system by default. You must configure the shared buffer size to be less than the total PFC buffer size. If the buffer size and DCB buffer threshold settings are applied on one or more ports, a validation is performed to determine whether following condition is satisfied: Shared-pfc-buffer-size <= (Total-pfc-buffer-size - Σpfc priority <> buffer-size on each port, priority). If the preceding condition is not satisfied by the shared PFC buffer size value, the configuration is not saved and a system logging message is generated as follows:

```
Dell(conf)#dcb pfc-shared-buffer-size 2000
```

```
%ERROR: pfc shared buffer size configured cannot accommodate
existing buffer requirement in the system.
```

Example	`Dell(conf)#dcb pfc-shared-buffer-size 5000`

dcb-buffer-threshold

Configure the profile name for the DCB buffer threshold. This utility is supported on the S4810, S4820T, and S6000 platforms.

S6000

Syntax	`dcb buffer—threshold` *`profile-name`*
Parameters	*profile-name*: Enter the name of the profile, which can be a string of up to 32 characters in length.
Default	None
Command Modes	CONFIGURATION mode
Command History	Version 9.3(0.0): Introduced on the S4810, S4820T, and S6000 platforms.
Usage Information	When you enter the profile name, you enter the DCB buffer threshold configuration mode. You can specify the shared buffer threshold limit, the ingress buffer size, buffer limit for pausing the acceptance of packets, and the buffer offset limit for resuming the acceptance of received packets.
Example	`S4810-YU-MR-Dell(conf)#dcb buffer—threshold test`

priority

Configure the priority for the PFC threshold to be allocated to the buffer space parameters. This utility is supported on the S6000 platforms.

Syntax

```
priority value buffer-size size pause-threshold threshold-value
resume-offset threshold-value shared-threshold-weight size
```

Parameters

priority	Specify the priority of the queue for which the buffer space settings apply
value	Enter a number in the range of 0 to 7 to denote the priority to be allocated to the dynamic buffer control mechanism

buffer-size	Ingress buffer size
size	Size of the ingress buffer in KB. Enter a number in the range of 0 to 7787. The default is 45 KB.
pause-threshold	Buffer limit for pause frames to be sent
threshold-value	Buffer limit at which the port sends the pause to peer in KB. Enter a number in the range of 0 to 7787. The default is 10 KB.
resume-offset	Buffer offset limit for resuming in KB
threshold-value	Buffer offset limit at which the port resumes the peer in KB. Enter a number in the range of 1 to 7787. The default is 10 KB.
shared-threshold-weight	Buffer shared threshold weight
size	Weightage of the priorities on the shared buffer size in the system. Enter a number in the range of 0 to 9. The default shared threshold weight is 10.

Default

The default size of the ingress buffer is 45 KB. The default buffer limit at which the port sends the pause to peer and recommences the sending of packets to the peer is 10 KB. The default threshold weight of the shared buffer space is 10.

Command Modes

DCB-BUFFER-THRESHOLD mode

Command History

Version 9.3(0.0)	Introduced on the S4810, S4820T, and S6000 platforms.

Usage Information

For each priority, you can specify the shared buffer threshold limit, the ingress buffer size, buffer limit for pausing the acceptance of packets, and the buffer offset limit for resuming the acceptance of received packets. When PFC detects congestion on a queue for a specified priority, it sends a pause frame for the 802.1p priority traffic to the transmitting device.

You can use the`priority`command to set up both the administrative and peer-related PFC priorities. For example, you can configure the intended buffer configuration for all eight priorities. If you configure the number of lossless queues as 4 and if the administrator-configured priorities configured within the DCB input policy is applied, then the configuration for those priorities are pre-designed. However, if the peer-provided priorities are applied, although a DCB input policy is present, the peer-provided priorities become effective for buffer configuration. This method of configuration provides an easy and flexible technique to accommodate both administratively-configured and peer-configured priorities.

Example

```
Dell(conf-dcb-buffer-thr)#priority 0 buffer-size 52 pause-
threshold 16 resume-offset 10 shared-threshold-weight 7
```

qos-policy-buffer

Create a QoS policy buffer and enter the configuration mode to configure the no-drop queues, ingress buffer size, buffer limit for pausing, and buffer offset limit for resuming. This utility is supported on the S6000

Syntax

```
qos-policy-buffer queue queue-num pause no-drop queue buffer-
size size pause-threshold threshold-value resume-offset
threshold-value shared-threshold-weight size
```

Parameters

policy-name	Name of the QoS policy buffer that is applied to an interface for this setting to be effective in conjunction with the DCB input policy. You can specify the shared buffer threshold limit, the ingress buffer size, buffer limit for pausing the acceptance of packets, and the buffer offset limit for resuming the acceptance of received packets. This method of configuration enables different peer-provided and administrative priorities to be set up because the intended queue is directly configured instead of determining the priority to queue mapping for local and remote parameters.
queue 0 to queue 7	Specify the queue number to which the QoS policy buffer parameters apply
pause	Pause frames to be sent at the specified buffer limit levels and pause packet settings
no-drop	The packets for this queue must not be dropped
value	Enter a number in the range of 0 to 7 to denote the priority to be allocated to the dynamic buffer control mechanism
buffer-size	Ingress buffer size
size	Size of the ingress buffer in KB. Enter a number in the range of 0 to 7787. The default is 45 KB.
pause-threshold	Buffer limit for pause frames to be sent
threshold-value	Buffer limit at which the port sends the pause to peer in KB. Enter a number in the range of 0 to 7787. The default is 10 KB.
resume-offset	Buffer offset limit for resuming in KB
threshold-value	Buffer offset limit at which the port resumes the peer in KB. Enter a number in the range of 1 to 7787. The default is 10 KB.
shared-threshold-weight	Buffer shared threshold weight
size	Weightage of the priorities on the shared buffer size in the system. Enter a number in the range of 0 to 9. The default shared threshold weight is 10.

Default

The default size of the ingress buffer is 45 KB. The default buffer limit at which the port sends the pause to peer and recommences the sending of packets to the peer is 10 KB. The default threshold weight of the shared buffer space is 10.

Command Modes

DCB-BUFFER-THRESHOLD mode

Command History

Version 9.3(0.0)	Introduced on the S4810, S4820T, S6000, and MXL platforms.

Usage Information

You must apply this buffer policy at the interface level for the attributes to be applicable in conjunction with the DCB input policy.

For each QoS policy buffer, you can specify the shared buffer threshold limit, the ingress buffer size, buffer limit for pausing the acceptance of packets, and the buffer offset limit for resuming the acceptance of received packets. When PFC detects congestion on a queue for a specified priority, it sends a pause frame for the 802.1p priority traffic to the transmitting device.

You can use set up both the administrative and peer-related PFC priorities. For example, you can configure the intended buffer configuration for all 8 priorities. If you configure the number of lossless queues as 4 and if the administrator-configured priorities configured within the DCB input policy is applied, then the configuration for those priorities are pre-designed. However, if the peer-provided priorities are applied, although a DCB input policy is present, the peer-provided priorities become effective for buffer configuration. This method of configuration provides an easy and flexible technique to accommodate both administratively-configured and peer-configured priorities.

Example

```
S4810-YU-MR-Dell(conf)# qos-policy-buffer test
S4810-YU-MR-Dell (conf-qos-policy-buffer)#queue 0 pause no-drop
buffer-size 128000 pause-threshold 103360 resume-threshold
83520

S4810-YU-MR-Dell (conf-qos-policy-buffer)# queue 4 pause no-
drop buffer-size 128000 pause-threshold 103360 resume-threshold
83520
```

dcb-policy buffer-threshold (Interface Configuration)

Assign the DCB policy to the DCB buffer threshold profile on interfaces. This setting takes precedence over the global buffer-threshold setting. This utility is supported on the S6000 platform.

Syntax

`dcb-policy buffer-threshold` *`profile-name`*

Parameters

buffer-threshold	Configure the profile name for the DCB buffer threshold

profile-name	Enter the name of the profile, which can be a string of up to 32 characters in length.

Default None

Command Modes INTERFACE mode

Command History

Version 9.3(0.0)	Introduced on the S4810, S4820T, and S6000 platforms.

Usage Information You can configure up to a maximum of four lossless (PFC) queues. By configuring four lossless queues, you can configure four different priorities and assign a particular priority to each application that your network is used to process. For example, you can assign a higher priority for time-sensitive applications and a lower priority for other services, such as file transfers. You can configure the amount of buffer space to be allocated for each priority and the pause or resume thresholds for the buffer. This method of configuration enables you to effectively manage and administer the behavior of lossless queues.

Example

```
Dell(conf-if-te-0/0)#dcb-policy buffer-threshold test
```

show qos dcb-buffer-threshold

Displays the DCB buffer threshold assigned to a QoS policy. This command is supported on the S6000 platform.

Syntax `show qos dcb buffer-threshold {name}`

Parameters

name	Enter the name of the profile, which can be a string of up to 32 characters in length.

Command Modes

EXEC

EXEC Privilege

Command History

Version 9.3(0.0)	Introduced on the S6000 platform.

Usage Information The following table describes the output fields displayed for the `show` command:

Field	Description
Name	Name of the DCB buffer threshold profile
Buffer threshold parameters	Buffer size allocated for the PFC priority queue and the priority of the queue

Example

```
Dell#show qos dcb buffer-threshold

Name   :      test1
Buffer threshold parameters:
pfc priority 0 buffer-size 40
pfc priority 3 buffer-size 50
```

show hardware stack-unit buffer-stats-snapshot (With Polling and History)

View the buffer statistics tracking resource information with polling details and historical snapshots. This command is supported on the S6000 platform.

Syntax

```
show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource X history Y
```

Parameters

stack-unit *number*	Unique ID of the stack unit to select a particular stack member and then enter one of the following command options to display a collection of data based on the option entered. The range is 0 to 11.
buffer-stats-snapshot unit *number*	Display the historical snapshot of buffer statistical values
unit	Enter the keyword `unit` along with a port-pipe number, then the keyword counters to display the counters on the selected port-pipe. The range is 0 to 0.
resource *X*	Buffer and traffic manager resources usage, where X can be one of the following: • All - Ingress and Egress resources snapshots • Port {id |all} queue {all} - egress queue-level snapshot for both unicast and multicast packets • Port {id |all} queue ucast {id | all} - egress queue-level snapshot for unicast packets only • Port {id |all} queue mcast {id | all} - egress queue-level snapshot for multicast packets only • Port {id |all} prio-group {id | all} - ingress priority-group level snapshot
history *Y*	Historical snapshot details of buffer space statistics, where *Y* can be one of the following: • Instance {all | id} - Displays the information for all instances or the specified instance of the snapshot.

- Summary - Displays the consolidated information pertaining to the preceding three instances of the snapshot values collected in history.

Command Modes

EXEC

EXEC Privilege

Command History

Version 9.3(0.0)	Introduced on the S6000 platform.

Usage Information

When you enter the "instance all" option, "show hardware stack-unit 0 buffer-stats-snapshot unit 0 resource X" Output for all available instances on the history collection is displayed.

When you enter the "instance id" option, "show hardware stack-unit 0 buffer-stats-snapshot unit 0 resource X" for specified instance alone is displayed.

When you enter the "summary" option, "show hardware stack-unit 0 buffer-stats-snapshot unit 0 resource X" will be enhanced to display the total buffered cells, shared cells, headroom cells for last 5 instances in the table format.

If information for specified instance id id is not available when you enter the show command, which occurs if you issue the command before the time elapsed for the snapshot to be captured for that instance ID, the following informational message is displayed on the console:

```
%Info: Data for instance id id is not available.
```

For example, if you configured 5 as the maximum instances with linear periodicity and a polling interval of 10 seconds, 1 as the multiplier, then 5 instances will be polled at 10, 20, 30, 40, and 50 seconds incrementally. If you attempt to enter the show command to display the fifth instance after 30 seconds of enabling polling, the aforementioned information message is shown.

If specified instance ID is higher than the size of the maximum number of snapshot instances configured, the following error message is displayed on the console:

```
%Error: Instance Id is not valid. Configured max snapshot
instances are <max-instances>
```

If you configured the maximum number of instances as 5 and attempt to view the buffer statistics tracking details for the instance ID of 6, the aforementioned error is shown.

Example

```
Dell#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 5 queue all history summary

Stack-unit 0 unit 0 port 5 (interface te 0/4)

-----------------------------------------------------------------
------------------------------------------------
Q# TYPE     Q#                         TOTAL BUFFERED CELLS
                                 Instance 1  Instance 2
Instance 3 Instance 4 Instance 5
                                 10S            20S
30S           40S           50S
---------------------------------------------------------------
------------------------------------------------
UCAST        2          5                4
6                 0               1
UCAST        3          2                0
1                 5               0
UCAST        11         0                3
2                 0               3
MCAST        4          0                0
0                 0               3
```

If only two instances are available at the time the above show command is issued, only two instances will be displayed in the summary output.

```
---------------------------------------------------------------
------------------------------------------------
Q# TYPE     Q#                         TOTAL BUFFERED CELLS
                                 Instance 1  Instance 2
                                 10S            20S
---------------------------------------------------------------
------------------------------------------------
UCAST        2          5                4
1
UCAST        3          2                0
UCAST        11         0                3
MCAST        4          0                0

Dell#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 5 prio-group all history summary

Stack-unit 0 unit 0 port 5 (interface te 0/4)

---------------------------------------------------------------
------------------------------------------------
PG#    Instance 1      Instance 2      Instance 3
Instance 4      Instance 5
         Shared Hdrm  Shared Hdrm  Shared Hdrm  Shared Hdrm
Shared Hdrm [in CELLS]
---------------------------------------------------------------
------------------------------------------------
6      9           2         0          0         1
0         4          1        7
1

7      0           0         0          0         1
0         0          0        0           0
```

In the following example, the Headroom Cells field indicates the amount of shared buffer area that is allocated to store packets that are received after the pause frame is received or a priority-based flow control pause frame is enabled. When an inbound interface halts the sending of traffic, it must have the buffer space to save all of the packets currently in the buffer, and also all of the packets that were received before the device stops the sending of packets. Headroom space is used for high-priority traffic that needs to be queued and preserved above the input queue limit, such as keepalives and hello messages.

You can use the following sample command output to obtain a consolidated, whole-scale set of statistical counters of buffer resource utilization in the system and identify the ports that you want. All resources will be cleared after their values are displayed.

```
Dell#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource all
Stack-unit: 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
PG#     SHARED CELLS     HEADROOM CELLS
---------------------------------------
0       0                0
1       0                0
2       0                0
3       0                0
4       0                0
5       0                0
6       0                0
7       0                0

---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
UCAST       10     0
UCAST       11     1
MCAST       0      0
MCAST       1      0
MCAST       2      0
MCAST       3      0
MCAST       4      0
MCAST       5      0
MCAST       6      0
MCAST       7      0
MCAST       8      0

Stack-unit: 0 unit: 0 port: 5 (interface Fo 0/4)
---------------------------------------
PG#     SHARED CELLS     HEADROOM CELLS
---------------------------------------
0       0                0
1       0                0
2       0                0
3       0                0
4       0                0
5       0                0
6       0                0
7       0                0
```

```
----------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
----------------------------------------
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
UCAST       10     0
UCAST       11     0
MCAST       0      0
MCAST       1      0
MCAST       2      0
MCAST       3      0
MCAST       4      0
MCAST       5      0
MCAST       6      0
MCAST       7      0
MCAST       8      0
<… snip …>
Stack-unit: 0 unit: 0 port: 104 (interface Te 0/124)
----------------------------------------
PG#     SHARED CELLS     HEADROOM CELLS
----------------------------------------
0       0                0
1       0                0
2       0                0
3       0                0
4       0                0
5       0                0
6       0                0
7       0                0

----------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
----------------------------------------
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
UCAST       10     0
UCAST       11     1
MCAST       0      0
MCAST       1      0
MCAST       2      0
MCAST       3      0
MCAST       4      0
MCAST       5      0
MCAST       6      0
MCAST       7      0
MCAST       8      0
```

To determine the port that is congested and monitor all queues (including multicast and unicast queues] only on that port:

```
Dell#$show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 1 queue all
Stack-unit: 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
UCAST       10     0
UCAST       11     1
MCAST       0      0
MCAST       1      0
MCAST       2      0
MCAST       3      0
MCAST       4      0
MCAST       5      0
MCAST       6      0
MCAST       7      0
MCAST       8      0
Dell#
```

To examine the port that is congested and monitor all multicast queues on that port:

```
Dell#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 1 queue mcast all
Stack-unit: 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
MCAST       0      0
MCAST       1      0
MCAST       2      0
MCAST       3      0
MCAST       4      0
MCAST       5      0
MCAST       6      0
MCAST       7      0
MCAST       8      0
Dell#
```

To determine the port that is congested and monitor all the unicast Queues on that port:

```
Dell#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 1 queue ucast all
Stack-unit: 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
```

```
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
UCAST       10     0
UCAST       11     0
Dell#
```

To identify the port that is congested and monitor all the priority groups on that particular port:

```
Dell#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 1 prio all
Stack-unit: 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
PG#     SHARED CELLS     HEADROOM CELLS
---------------------------------------
0       0                0
1       0                0
2       0                0
3       0                0
4       0                0
5       0                0
6       0                0
7       0                0
Dell#
```

To determine the specific priority group, unicast or multicast queue that is congested and monitor that queue separately:

```
Dell#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 1 prio 6
Stack-unit: 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
PG#     SHARED CELLS     HEADROOM CELLS
---------------------------------------
6       0                0
```

dcb pfc-total-buffer-size

Configure the total buffer size for PFC in kilobytes. This utility is supported on the S6000 platform.

S6000

Syntax	`dcb pfc-total—buffer—size` *`KB`*
Parameters	*KB* Enter a number in the range of 0 to 7787.

Default	The default is 1 KB for S6000 platforms.
Command Modes	CONFIGURATION mode
Command History	**Version 9.3(0.0)** Introduced on the S6000 platform.
Usage Information	Configure the maximum buffer available for PFC traffic. You can choose to increase or decrease the buffer size that is currently allocated in the system by default. However, if you modify the PFC buffer size to be lower than the previously configured PFC buffer size, the system determines whether this reduction in size is valid without disrupting the existing configuration. In such a scenario, you must disable and re-enable DCB. For example, if you modify the total buffer size to be 4000 KB from the previous size of 5000 KB, an error message is displayed that this reduction cannot be performed owing to existing system configuration because of queues that are being currently processed. The lossless queue limit per port is validated based on the `dcb pfc-queues` command. PFC queue configuration identifies the maximum number of queues a port can support. Although the queue limit per port is a baseline when dynamic buffering is enabled, the limit per port for queues depends on the availability of the buffer.
Example	

```
Dell(conf)#dcb pfc-total-buffer-size 5000

Dell(conf)#dcb pfc-total-buffer-size 4000 %ERROR: Total pfc
buffer size configured cannot accommodate existing buffer
requirement in the system.
```

show running-config dcb-buffer-threshold

Displays the DCB buffer threshold details in the running configuration. This command is supported on the S6000 platform.

Syntax	`show running—config buffer-threshold`
Command Modes	EXEC EXEC Privilege
Command History	**Version 9.3(0.0)** Introduced on the S6000 platform.
Usage Information	The following table describes the output fields displayed for the `show running-config dcb-buffer-threshold` command:

Field	Description
Profile name	Name of the DCB buffer threshold profile
Priority	The priority of the queue for which the buffer space settings apply
buffer-size	Ingress buffer size
pause-threshold-value	Buffer limit at which the port sends the pause to peer in KB.
resume-threshold-value	Buffer offset limit at which the port resumes the peer in KB.

Example

```
Dell#show run buffer-threshold
!
dcb-buffer-threshold test1
pfc priority 0 buffer-size 40
pfc priority 3 buffer-size 50
!
dcb-buffer-threshold test2
pfc priority 0 buffer-size 80 pause-threshold 50
!
dcb-buffer-threshold test3
pfc priority 0 buffer-size 80 pause-threshold 60 resume-
threshold 30


On interface on which PFC is enabled:

Show interface tengigabitethernet 0/0 pfc buffer-threshold
---------------------------------------------------------------
------------------------------
Queue#   Lossless    Buffer-size   Pause-threshold      Resume-
offset        Shared threshold
                     (KB)                 (KB)
(KB)          weight
---------------------------------------------------------------
------------------------------
0        No          -                    -
-                    -
1        No          -                    -
-                    -
2        Yes         -                    20
-                    9
3        Yes         52                   25
15                   0
4        Yes         -                    45
25                   5
5        No          -                    -
-                    -
6        No          -                    -
-                    -
7        No          -                    -
-                    -
-    Denotes dynamic buffering is enabled in respective queues
```

```
On interface in which PFC is not enabled:
```

```
Dell#show interface tengigabitethernet 0/20 pfc buffer-
threshold
```

The following table describes the output fields displayed for the `show interface pfc buffer-threshold` command:

Field	Description
queue	Number of the queue
lossless	Whether the queue is a lossy or lossless queue for which buffer threshold is configured
buffer-size	Ingress buffer size
pause-threshold-value	Buffer limit at which the port sends the pause to peer in KB.
resume-threshold-value	Buffer offset limit at which the port resumes the peer in KB.
shared threshold weight	Weightage of the priorities on the shared buffer size in the system.

dcb pfc-queues

Configure the number of PFC queues. This utility is supported on the and S6000platforms.

Syntax `dcb pfc-queues` *`value`*

Parameters

value	Enter the number of PFC queues in the range of 0 through 4. The number of ports supported based on lossless queues configured will depend on the buffer.

Default The default number of PFC queues in the system is 2 for S4810 and 1 for S6000 platforms.

Command Modes CONFIGURATION mode

Command History

Version 9.3(0.0)	Introduced on the S4810 and S6000 platforms.

Usage Information You can configure up to a maximum of four lossless (PFC) queues. By configuring four lossless queues, you can configure four different priorities and assign a particular priority to each application that your network is used to process. For example, you can assign a higher priority for time-sensitive applications and a lower priority for other services, such as file transfers. You can configure the amount of buffer space to be allocated for each priority and the pause or resume thresholds for the buffer. This method of configuration enables you to effectively manage and administer the behavior of lossless queues.

Example

```
Dell(conf)#dcb pfc-queues 4
```

dcb <ets | pfc> enable

Enable priority flow control or enhanced transmission selection on interface.

This feature is supported on S6000 platform.

Syntax

```
dcb <ets | pfc> enablepfc >enable
```

- To disable ETS on interface, use "**no dcb ets enable**" command.
- To disable PFC on interface, use "**no dcb pfc enable**" command.

Defaults Enable

Command Modes INTERFACE

Command History

Version 9.3 (0.1)	Introduced on S6000, S4810, and S4820T.

Usage Information

PFC and ETS are enabled by default on the interfaces when DCB is globally enabled (refer to dcb enable). In some network topology, you may want to disable PFC on an interface and apply link level flow control; Similarly you may want to disable ETS on an interface and apply QoS bandwidth configurations.

Limitations

- "`dcb-map`" CLI on interface is mutually exclusive to "`no dcb ets enable`" and "`no dcb pfc enable`".
- "`pfc priority`" CLI is mutually exclusive to "`no dcb pfc enable`" command.
- Deprecated CLI "`dcb-policy input`" and "`no dcb pfc enable`" cannot coexist at interface level.
- Deprecated CLI "`dcb-policy output`" and "`no dcb ets enable`" cannot coexist at interface level.

Related Commands

dcb-input—applies dcb-input profile on interface.

dcb-policy output—applies dcb-output profile on interface.

pfc priority—enable PFC on 802.1p priority traffic without using a dcb-map.

dcb-map—applies dcb-map profile on interface.

13

Debugging and Diagnostics

The basic debugging and diagnostic commands are supported by the Dell Networking Operating System (OS) on the S6000 platform.

This chapter contains the following sections:

- Offline Diagnostic Commands
- Buffer Tuning Commands
- Hardware Commands

Diagnostics and Monitoring Commands

The following section describes the diagnostics and monitoring commands.

For similar commands, refer to the Control and Monitoring chapter.

logging coredump server

Enable the platform to send application core dumps to an FTP server.

S6000

Syntax

```
logging coredump server {ftp-server | ip-address | ipv6-
address} username (ftp-username | name} password [type] {ftp-
password | password}
```

Parameters

ftp-server	Enter the hostname or IP address of the FTP server where Dell Networking OS sends application core dumps.
ip-address	Enter the IP address of the target server in dotted decimal format.
ipv6-address	Enter an IPv6 address of the target server, in the x:x:x:x::x format. NOTE: The :: notation specifies successive hexadecimal fields of zeros.
name	Enter a username to access the target server.
ftp-username	Enter the user name to access the target ftp server.
type	Enter the password type: • Enter 0 to enter an un-encrypted password. • Enter 7 to enter a password that has already been encrypted using a Type 7 hashing algorithm.

password	Enter a password to access the target server.
ftp-password	Enter the password of the target ftp server where the application core dump files will be uploaded. The password can be up to 15 alphanumeric characters; no special characters are allowed.

Defaults

Crash kernel files are uploaded to flash by default.

Command Modes

CONFIGURATION

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Added information about ftp password and URL to *Usage Information*.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.1.0	Added support for IPv6.
Version 7.7.1.0	Restructured the command to accommodate core dumps for CP. Introduced on the C-Series and S-Series.
Version 6.1.1.0	Introduced

Usage Information

You must use this command to enable core dump logging before a software exception occurs. If the FTP server is unreachable, Dell Networking OS aborts the application core dump.

When you enable this command to allow the system to automatically upload application core dumps to an FTP server, you are requested to enter a username and password. Use the username and password of the FTP server where the core files are being moved. The password can be up to 15 alphanumeric characters only; no special characters are allowed. After you enter the password, an FTP URL is created with the credentials in the operating system. The CLI monitors application core dumps in the unit. Any application core dumps that occur are automatically uploaded to the FTP server.

Because flash space may be limited, using this command ensures your entire crash kernel files are uploaded successfully and completely. You can only configure a single coredump server. Configuration of a new coredump server over-writes any previously configured server.

NOTE: You must disable logging coredump before you designate a new server destination for your core dumps.

logging coredump stack-unit

Enable coredump on a stack.

S6000

Syntax

```
logging coredump stack-unit {0–5 | all}
```

Parameters

stack-unit ***0–5***	Enter the stack-unit id. For S6000 the range is from 0 to 5.
all	Enable coredump on all stack-unit.

Defaults Enabled by default on customer builds.

Command Modes CONFIGURATION

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information The Kernel core dump can be large and may take up to 5 to 30 minutes to upload. Dell Networking OS does not overwrite application core dumps so you should delete them as necessary to conserve space on the flash; if the flash is out of memory, the coredump is aborted. On the S-Series, if the FTP server is not reachable, the application coredump is aborted. Dell Networking OS completes the coredump process and wait until the upload is complete before rebooting the system.

tcpdump

Enable a TCP dump for CPU bound traffic.

S6000

Syntax

```
tcpdump cp [capture-duration time | filter expression value |
packet-count value | snap-length value | write-to path]
```

To disable the TCP dump, use the `no tcpdump` command.

Parameters

capture-duration	Enter the time for packet capturing. The timer begins as soon as the command is enabled. The range is 20 to 9000 seconds.

filter	Specify the packet that will be dumped. If no filter is entered, all packets are dumped. Filter expressions usually consist of an id (name or number) preceded by one or more qualifiers. There are three different kinds of qualifier: type, direction, or protocol. Enclose the filter option with double quotes: "port 20." The range is 1 to 100 characters.
packet-count	Enter the number of packets to capture. The counter begins as soon as the command is enabled. The range is 10 to 150000.
snap-length	Enter the number of bytes per packet to capture. Use this option to reduce the size of the captured packets, to capture only the needed headers and avoid rest of the data portion of the packet. The range is 0 to 1200.
write-to	Enter the location to save the captured packets. Files can be saved to flash, to FTP, SCP, or TFTP: • `flash://filepath` • `ftp://userid:password@hostip/filepath` • `scp://userid:password@hostip/filepath` • `tftp://hostip/filepath`

Defaults Disable

Command Modes EXEC Privilege

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

You can use the capture-duration timer and the packet-count counter at the same time. The TCP dump stops when the first of the thresholds is met. That means that even if the duration timer is 9000 seconds, if the maximum file count parameter is met first, the dumps stop.

Entering `no tcpdump stops` the file dump immediately, without waiting for a threshold to be met.

The files saved on the flash are located in the flash://TCP_DUMP_DIR/Tcpdump_<time_stamp_dir>/directory. The file name is tcpdump_*.pcap. There can be up to 20 Tcpdump_<time_stamp_dir> directories. If more than 20 files are created, the oldest is overwritten.

Offline Diagnostic Commands

The offline diagnostics test suite is useful for isolating faults and debugging hardware. While tests are running, Dell Networking OS results are saved as a text file (TestReport-SU-X.txt) in the flash directory. This `show file` command is available only on master and standby.

Important Points to Remember

- Offline diagnostics can only be run when the unit is offline.
- You can only run offline diagnostics on a unit to which you are connected via the console. In other words, you cannot run diagnostics on a unit to which you are connected to via a stacking link.
- Diagnostic results are printed to the screen. Dell Networking OS does not write them to memory.
- Diagnostics only test connectivity, not the entire data path.

diag stack-unit

Run offline diagnostics on a stack unit.

S6000

Syntax

```
diag stack-unit number [alllevels | level0 | level1 | level2]
verbose testname
```

Parameters

number	Enter the stack-unit id. Range from 0 to 5. Enter the stack-unit number. The range is from 0 to 7.
alllevels	Enter the keyword `alllevels` to run the complete set of offline diagnostic tests.
level0	Enter the keyword `level0` to run Level 0 diagnostics. Level 0 diagnostics check for the presence of various components and perform essential path verifications. In addition, they verify the identification registers of the components on the board.
level1	Enter the keyword `Level1` to run Level 1 diagnostics. Level 1 diagnostics is a smaller set of diagnostic tests with support for automatic partitioning. They perform status/self test for all the components on the board and test their registers for appropriate values. In addition, they perform extensive tests on memory devices (for example, SDRAM, flash, NVRAM, EEPROM, and CPLD) wherever possible. There are no tests on 10G links. At this level, stack ports are shut down automatically.
level2	Enter the keyword `level2` to run Level 2 diagnostics. Level 2 diagnostics are a full set of diagnostic tests with no support for automatic partitioning. Level 2 diagnostics are used primarily for on-board loopback tests and more extensive component diagnostics. Various components on the board are put into Loopback mode and test packets are transmitted

	through those components. These diagnostics also perform snake tests using VLAN configurations. To test 10G links, physically remove the unit from the stack.
verbose	Enter the keyword `verbose` to run the diagnostic in Verbose mode. Verbose mode gives more information in the output than Standard mode.
testname	Enter the keyword `level2` to run a specific test case. Enclose the test case name in double quotes (" "). For example: `diag stack-unit 1 level1 testname "first"`.

Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced the `verbose` option.
Version 7.7.1.0	Introduced on the S-Series.

offline stack-unit

Place a stack unit in the offline state.

S6000

Syntax `offline stack-unit *number*`

Parameters

number	Enter the stack-unit id. Range from 0 to 5.

Defaults	none
Command Modes	EXEC Privilege

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added a warning message to the off-line diagnostic.
Version 7.7.1.0	Introduced on the S-Series.

Usage Information

You cannot enter this command on a Master or Standby unit.

The system reboots when the off-line diagnostics complete. This reboot is an automatic process. A warning message appears when the `offline stack-unit` command is implemented.

```
Warning - Diagnostic execution will cause stack-unit to reboot
after completion of diags.

Proceed with Offline-Diags [confirm yes/no]:y
```

Related Commands

show environment (S-Series) — views the S-Series system component status (for example, temperature, voltage).

online stack-unit

Place a stack unit in the online state.

S6000

Syntax

```
online stack-unit number
```

Parameters

number	Enter the stack-unit number. The S6000 range is from 0 to 5.

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.

Usage Information

You cannot enter this command on a Master or Standby unit.

The system reboots when the off-line diagnostics complete. This reboot is an automatic process. A warning message appears when the `offline stack-unit` command is implemented.

```
Warning - Diagnostic execution will cause stack-unit to reboot
after completion of diags.

Proceed with Offline-Diags [confirm yes/no]:y
```

Related Commands

show environment (S-Series) — views the S-Series system component status (for example, temperature, voltage).

Hardware Commands

These commands display information from a hardware sub-component or ASIC.

clear hardware stack-unit

Clear statistics from selected hardware components.

S6000

Syntax

```
clear hardware stack-unit id {counters | unit 0–0 counters |
cpu data-plane statistics | cpu i2c statistics | cpu party-bus
statistics | cpu sata-interface statistics | stack-port 0–127}
```

Parameters

stack-unit *id*	Enter the keywords `stack-unit` then a number to select a particular stack member and then enter one of the following command options to clear a specific collection of data. The range is 0 to 5.
counters	Enter the keyword `counters` to clear the counters on the selected stack member.

unit *number* counters	Enter the keyword `unit` along with a port-pipe number, then the keyword counters to clear the counters on the selected port-pipe. The range is 0 to 0 for the S6000.
cpu data-plane statistics	Enter the keywords `cpu data-plane statistics` to clear the data plane statistics.
cpu party-bus statistics	Enter the keywords `cpu party-bus statistics` to clear the management statistics.
stack-port	Enter the keywords `stack-port` then the port number of the stacking port to clear the statistics of the particular stacking port. The range is 0 to 127 for the S6000.

Defaults none

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.0	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Related Commands

show hardware stack-unit — displays the data plane or management plane input and output statistics of the designated component of the designated stack member.

clear hardware system-flow

Clear system-flow statistics from selected hardware components.

S6000

Syntax

```
clear hardware system-flow layer2 stack-unit number port-set 0-
0 counters
```

Parameters

stack-unit *number*	Enter the keywords `stack-unit` then a number to select a particular stack member and then enter one of the following command options to clear a specific collection of data. The range is 0 to 5 for the S6000.

port-set *0–0* counters	Enter the keywords `port-set` along with a port-pipe number, then the keyword counters to clear the system-flow counters on the selected port-pipe. The range is 0 to 0 for the S6000.

Defaults none

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.0	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Related Commands

show hardware stack-unit — displays the data plane or management plane input and output statistics of the designated component of the designated stack member.

hardware watchdog

To trigger a reboot and restart the system, set the watchdog timer.

S6000

Syntax `hardware watchdog stack-unit {<0-5> | all}`

Defaults Enabled.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.0	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 7.8.1.0	Introduced on the S-Series.

Usage Information

This command enables a hardware watchdog mechanism that automatically reboots an Dell Networking OS switch/ router with a single unresponsive unit. This behavior is a last-resort mechanism intended to prevent a manual power cycle.

show hardware layer2

Display Layer 2 ACL or eg data for the selected stack member and stack member port-pipe.

S6000

Syntax

`show hardware layer2 {eg-acl | in-acl} stack-unit id port-set 0–0`

Parameters

eg-acl | in-acl	Enter either the keyword `eg-acl` or the keyword `in-acl` to select between ingress or egress ACL data.
stack-*unit id*	Enter the keyword `stack-unit` to select a stack ID. The range is 0 for the S6000.
port-set *0–0*	Enter the keywords `port-set` with a port-pipe number. . The range is 0 for the S6000.

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Usage Information

The unit numbers given are internal port numbers.

show hardware layer3

Display Layer 3 ACL or QoS data for the selected stack member and stack member port-pipe.

S6000

Syntax	`show hardware layer3 {acl	qos} stack-unit` *`number`* `port-set` *`0–0`*

Parameters

acl | qos	Enter either the keyword `acl` or the keyword `qos` to select between ACL or QoS data.
stack-unit *number*	Enter the keywords `stack-unit` then a number to select a stack ID. The range is 0 to 5 for the S6000.
port-set *0–0*	Enter the keyword port-set with a port-pipe number. The range is 0 to 0 for the S6000.

Defaults	none
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.0	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

show hardware stack-unit

Display the data plane or management plane input and output statistics of the designated component of the designated stack member.

S6000

Syntax

```
stack-unit <id> {cpu data-plane statistics | cpu management
statistics | [ drops [unit number [port 1-104] | user-port
0-127] | fpga register | party-bus statistics | stack-port |
ti-monitor | unit 0-1 {counters | details | port-stats [detail]
| register}}
```

Parameters

stack-unit *stack-unit* {command-option}	Enter the keywords `stack-unit` to select a particular stack member and then enter one of the following command options to display a collection of data based on the option entered. The range is from 0 to 5.
buffer	Enter the keyword `buffer`. To display the total buffer statistics for the stack unit, enter the keyword `total-buffer`. To display the buffer statistics for a specific unit, enter the keyword `unit` and a unit number 0 or 3. To display the buffer statistics for a specific port, enter the keyword `port` and a port number from 1 to 104. To display total buffer information for the port, enter the keywords `buffer-info`. To display a queue range, enter 0 to 14 for a specfic queue or `all`.
cpu data-plane statistics	(Optional) Enter the keywords `cpu data-plane statistics` then the keywords `stack port` and its number, from 0 to 63 to display the data plane statistics, which shows the High Gig (`Higig`) port raw input/output counter statistics to which the stacking module is connected.
cpu management statistics	Enter the keywords `cpu management statistics` to display the counters of the management port.
	Enter the keywords `cpu party-bus statistics`, to display the Management plane input/output counter statistics of the pseudo party bus interface.
drops [unit *unit-number* [port *port-number* | no]]	Enter the keyword `drops` to display internal drops on the selected stack member. Enter the drops keyword to display internal drops on the selected stack member. Option unit 0 followed by port 1-104 (in S6000) is based on internal/ hardware port number" and "option user-port 0-127 is to see the drop using user port numbering convention.
fpga register	Enter the keyword to display the register value of fpga resgister details in S4810, Z9000 and S6000.
stack-port *port-number*	Enter the keywords `stack-port` and a stacking port number to select a stacking port for which to display statistics. The range is 0 to 127.
unit *unit-number* {counters | details | port-stats [detail] | register}	Enter the keyword `unit` then `0` to `3` and then enter one of the following keywords to troubleshoot errors on the selected port-pipe and to give status on why a port is not coming up to register level: `counters`, `details`, `port-stats [detail]`, or `register`.

TI monitor	Enter the unit keyword to show information regarding the TI register.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Modified the `drops` keyword range, unit keyword `range` and added the `buffer` and `cpu management statistics` options.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.5	Added i2c statistics and sata-interfaces statistics.
Version 8.3.11.4	Added user port information.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.

Example (Data-Plane)

```
Dell#show hardware stack-unit 0 cpu data-plane statistics
Input Statistics:
 1856 packets, 338262 bytes
 141 64-byte pkts, 1248 over 64-byte pkts, 11 over 127-byte
pkts
 222 over 255-byte pkts, 236 over 511-byte pkts, 0 over 1023-
byte pkts
 919 Multicasts, 430 Broadcasts
 0 runts, 0 giants, 0 throttles
 0 CRC, 0 overrun, 0 discarded
Output Statistics:
 325 packets, 27629 bytes, 0 underruns
 9 64-byte pkts, 310 over 64-byte pkts, 1 over 127-byte pkts
 1 over 255-byte pkts, 2 over 511-byte pkts, 2 over 1023-byte
pkts
 0 Multicasts, 3 Broadcasts, 322 Unicasts
 0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
 Input 00.00 Mbits/sec
 Output 00.00 Mbits/sec
Dell#
```

Example (Party-Bus)

```
Dell#show hardware stack-unit 0 cpu party-bus statistics
Input Statistics:
 8189 packets, 8076608 bytes
 0 dropped, 0 errors
```

```
Output Statistics:
 366 packets, 133100 bytes
 0 errors
Dell#
```

Example (Drops)

```
Dell#sh hard stack-unit 0 drops
UNIT No: 0
Total Ingress Drops: 0
Total IngMacDrops:   0
Total MmuDrops:      0
Total EgMacDrops:    0
Total Egress Drops:  0
Dell#
```

Example (Drops Unit)

```
Dell#sh hard stack-unit 0 drops unit 0
PortNumberIngress Drops IngMac Drops Total Mmu Drops
1          0             0            0
2          0             0            0
3          0             0            0
4          0             0            0
EgMac Drops Egress Drops
0           0
0           0
0           0
0           0
Dell#
```

Example (Drops Unit, Port)

```
Dell#show hardware stack-unit 0 drops unit 1 port 27
--- Ingress Drops ---
Ingress Drops               : 0
IBP CBP Full Drops          : 0
PortSTPnotFwd Drops         : 0
IPv4 L3 Discards            : 0
Policy Discards             : 0
Packets dropped by FP       : 0
(L2+L3) Drops               : 0
Port bitmap zero Drops      : 0
Rx VLAN Drops               : 0
--- Ingress MAC counters---
Ingress FCSDrops            : 0
Ingress MTUExceeds          : 0
--- MMU Drops ---
HOL DROPS                   : 0
TxPurge CellErr             : 0
Aged Drops                  : 0
--- Egress MAC counters---
Egress FCS Drops            : 0
--- Egress FORWARD PROCESSOR Drops ---
IPv4 L3UC Aged & Drops      : 0
TTL Threshold Drops         : 0
INVALID VLAN CNTR Drops     : 0
L2MC Drops                  : 0
PKT Drops of ANY Conditions : 0
Hg MacUnderflow             : 0
TX Err PKT Counter          : 0 25
Dell#
```

Example (Port-Stats)

```
Dell#show hardware stack-unit 0 unit 0 port-stats
     ena/ speed/ link auto STP                lrn inter max
loop
```

```
port link duplex scan neg? state pause discrd ops face frame
back
ge0  down  -     SW   Yes  Block       Untag  FA  SGMII 1554
ge1  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge2  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge3  !ena  -     SW   Yes  Block       Tag    FA  SGMII 1554
ge4  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge5  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge6  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge7  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge8  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge9  !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge10 !ena  -     SW   Yes  Forward     Tag    F   SGMII 9252
ge11 !ena  -     SW   Yes  Forward     Tag    F   SGMII 9252
ge12 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge13 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge14 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge15 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge16 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge17 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge18 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge19 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge20 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge21 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge22 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
ge23 !ena  -     SW   Yes  Forward     Tag    F   SGMII 1554
hg0 up 12G FD    SW   No   Forward     None   F   XGMII 16360
hg1 up 12G FD    SW   No   Forward     None   F   XGMII 16360
hg2 down 10G FD  SW   No   Forward     None   F   XGMII 16360
hg3 down 10G FD  SW   No   Forward     None   F   XGMII 16360
0
Dell#
```

Example (Register)

```
Dell#show hardware stack-unit 0 unit 1 register
0x0068003c AGINGCTRMEMDEBUG.mmu0 = 0x00000000
0x0068003d AGINGEXPMEMDEBUG.mmu0 = 0x00000000
0x00680017 ASFCONFIG.mmu0 = 0x0000000e
0x0060004c ASFPORTSPEED.ge0 = 0x00000000
0x0060104c ASFPORTSPEED.ge1 = 0x00000000
0x0060204c ASFPORTSPEED.ge2 = 0x00000000
0x0060304c ASFPORTSPEED.ge3 = 0x00000000
0x0060404c ASFPORTSPEED.ge4 = 0x00000000
0x0060504c ASFPORTSPEED.ge5 = 0x00000000
0x0060604c ASFPORTSPEED.ge6 = 0x00000000
0x0060704c ASFPORTSPEED.ge7 = 0x00000000
0x0060804c ASFPORTSPEED.ge8 = 0x00000000
0x0060904c ASFPORTSPEED.ge9 = 0x00000000
0x0060a04c ASFPORTSPEED.ge10 = 0x00000000
0x0060b04c ASFPORTSPEED.ge11 = 0x00000000
0x0060c04c ASFPORTSPEED.ge12 = 0x00000000
0x0060d04c ASFPORTSPEED.ge13 = 0x00000000
0x0060e04c ASFPORTSPEED.ge14 = 0x00000000
0x0060f04c ASFPORTSPEED.ge15 = 0x00000000
0x0061004c ASFPORTSPEED.ge16 = 0x00000000
0x0061104c ASFPORTSPEED.ge17 = 0x00000000
0x0061204c ASFPORTSPEED.ge18 = 0x00000000
0x0061304c ASFPORTSPEED.ge19 = 0x00000000
0x0061404c ASFPORTSPEED.ge20 = 0x00000000
0x0061504c ASFPORTSPEED.ge21 = 0x00000000
0x0061604c ASFPORTSPEED.ge22 = 0x00000000
0x0061704c ASFPORTSPEED.ge23 = 0x00000005
0x0061804c ASFPORTSPEED.hg0 = 0x00000007
0x0061904c ASFPORTSPEED.hg1 = 0x00000007
```

```
0x0061a04c ASFPORTSPEED.hg2 = 0x00000000
0x0061b04c ASFPORTSPEED.hg3 = 0x00000000
0x0061c04c ASFPORTSPEED.cpu0 = 0x00000000
0x00780000 AUX_ARB_CONTROL.ipipe0 = 0x0000001c
0x0e700102 BCAST_BLOCK_MASK.ge0 = 0x00000000
0x0e701102 BCAST_BLOCK_MASK.ge1 = 0x00000000
0x0e702102 BCAST_BLOCK_MASK.ge2 = 0x00000000
0x0e703102 BCAST_BLOCK_MASK.ge3 = 0x00000000
0x0e704102 BCAST_BLOCK_MASK.ge4 = 0x00000000
0x0e705102 BCAST_BLOCK_MASK.ge5 = 0x00000000
0x0e706102 BCAST_BLOCK_MASK.ge6 = 0x00000000
0x0e707102 BCAST_BLOCK_MASK.ge7 = 0x00000000
0x0e708102 BCAST_BLOCK_MASK.ge8 = 0x00000000
0x0e709102 BCAST_BLOCK_MASK.ge9 = 0x00000000
0x0e70a102 BCAST_BLOCK_MASK.ge10 = 0x00000000
0x0e70b102 BCAST_BLOCK_MASK.ge11 = 0x00000000
0x0e70c102 BCAST_BLOCK_MASK.ge12 = 0x00000000
0x0e70d102 BCAST_BLOCK_MASK.ge13 = 0x00000000
0x0e70e102 BCAST_BLOCK_MASK.ge14 = 0x00000000
0x0e70f102 BCAST_BLOCK_MASK.ge15 = 0x00000000
0x0e710102 BCAST_BLOCK_MASK.ge16 = 0x00000000
0x0e711102 BCAST_BLOCK_MASK.ge17 = 0x00000000
0x0e712102 BCAST_BLOCK_MASK.ge18 = 0x00000000
0x0e713102 BCAST_BLOCK_MASK.ge19 = 0x00000000
0x0e714102 BCAST_BLOCK_MASK.ge20 = 0x00000000
0x0e715102 BCAST_BLOCK_MASK.ge21 = 0x00000000
0x0e716102 BCAST_BLOCK_MASK.ge22 = 0x00000000
0x0e717102 BCAST_BLOCK_MASK.ge23 = 0x00000000
0x0e718102 BCAST_BLOCK_MASK.hg0 = 0x00000000
0x0e719102 BCAST_BLOCK_MASK.hg1 = 0x00000000
0x0e71a102 BCAST_BLOCK_MASK.hg2 = 0x00000000
0x0e71b102 BCAST_BLOCK_MASK.hg3 = 0x00000000
0x0e71c102 BCAST_BLOCK_MASK.cpu0 = 0x00000000
0x0b700001 BCAST_STORM_CONTROL.ge0 = 0x00000000
0x0b701001 BCAST_STORM_CONTROL.ge1 = 0x00000000
0x0b702001 BCAST_STORM_CONTROL.ge2 = 0x00000000
0x0b703001 BCAST_STORM_CONTROL.ge3 = 0x00000000
0x0b704001 BCAST_STORM_CONTROL.ge4 = 0x00000000
0x0b705001 BCAST_STORM_CONTROL.ge5 = 0x00000000
0x0b706001 BCAST_STORM_CONTROL.ge6 = 0x00000000
0x0b707001 BCAST_STORM_CONTROL.ge7 = 0x00000000
0x0b708001 BCAST_STORM_CONTROL.ge8 = 0x00000000
0x0b709001 BCAST_STORM_CONTROL.ge9 = 0x00000000
0x0b70a001 BCAST_STORM_CONTROL.ge10 = 0x00000000
!------------------ output truncated ---------------!
```

Example (Details)

```
e10#
show hardware stack-unit 0 unit 1 details

*****************************************************

The total no of FP & CSF Devices in the Card is 2
The total no of FP Devices in the Card is 2
The total no of CSF Devices in the Card is 0
The number of ports in device 0 is - 24
The number of Hg ports in devices 0 is - 4
The CPU Port of the device is 28
The number of ports in device 1 is - 24
The number of Hg ports in devices 1 is - 4
The CPU Port of the device is 28
The staring unit no the SWF in the device is 0
*****************************************************
```

```
The Current Link Status Is

Front End Link Status 0x000000000004000000000000
Front End Port Present Status 0x000000000000000000000000
Back Plane Link Status 0x00000000

******************************************************

Link Status of all the ports in the Device - 1
The linkStatus of Front End Port 0 is FALSE
The linkStatus of Front End Port 1 is FALSE
The linkStatus of Front End Port 2 is FALSE
The linkStatus of Front End Port 3 is FALSE
The linkStatus of Front End Port 4 is FALSE
The linkStatus of Front End Port 5 is FALSE
The linkStatus of Front End Port 6 is FALSE
The linkStatus of Front End Port 7 is FALSE
The linkStatus of Front End Port 8 is FALSE
The linkStatus of Front End Port 9 is FALSE
The linkStatus of Front End Port 10 is FALSE
The linkStatus of Front End Port 11 is FALSE
The linkStatus of Front End Port 12 is FALSE
The linkStatus of Front End Port 13 is FALSE
The linkStatus of Front End Port 14 is FALSE
The linkStatus of Front End Port 15 is FALSE
The linkStatus of Front End Port 16 is FALSE
The linkStatus of Front End Port 17 is FALSE
The linkStatus of Front End Port 18 is FALSE
The linkStatus of Front End Port 19 is FALSE
The linkStatus of Front End Port 20 is FALSE
The linkStatus of Front End Port 21 is FALSE
The linkStatus of Front End Port 22 is FALSE
The linkStatus of Front End Port 23 is TRUE
The linkStatus of Hg Port 24 is TRUE
The linkStatus of Hg Port 25 is TRUE
The linkStatus of Hg Port 26 is FALSE
The linkStatus of Hg Port 27 is FALSE
!------------------ output truncated ---------------!
```

Example (Total-Buffer)

```
Dell(conf)#show hardware stack-unit 0 buffer total-buffer

Dell#sh hardware stack-unit 0 buffer total-buffer
----- Buffer Details for Stack-Unit 0 -----
Total Buffers allocated per Stack-Unit 46080
```

Example (Buffer-Info)

```
Dell(conf)#sh hardware stack-unit 0 buffer unit 0 port 1
buffer-info
----- Buffer Stats for Unit 0 Port 1 -----
Maximum Shared Limit for the Port: 30720
Default Packet Buffer allocate for the Port: 120

Used Packet Buffer for the Port: 0
```

Example (Queue2/ Buffer-Info)

```
Dell(conf)#sh hardware stack-unit 0 buffer unit 0 port 1 queue
2 buffer-info

----- Buffer Stats for Unit 0 Port 1 Queue 2 -----
Maximum Shared Limit: 30720
Default Packet Buffer allocate for the Queue: 8
Used Packet Buffer: 0
```

Related Commands	[clear hardware system-flow](#) — clears the statistics from selected hardware components. [show interfaces stack-unit](#) — displays information on all interfaces on a specific S-Series stack member. [show processes cpu (S-Series)](#) — displays the CPU usage information based on the processes running in an S-Series. [show system (S-Series and Z-Series)](#) — displays the current status of all the stack members or a specific member.

show hardware stack-unit buffer

Display the counters for the specified port, minimum guaranteed buffer of a priority-group, and the shared buffer. This command is supported on the S6000 platform.

Syntax

```
show hardware stack-unit <0-5> buffer unit <0-0> port {1-104 |
all} priority-group <0 -7> buffer-info
```

Parameters

stack-unit <*0–5*>	Enter the keywords `stack-unit` to select a particular stack member and then enter one of the following command options to display a collection of data based on the option entered. The range is 0 to 5.
buffer unit <*0–5*>	Enter the keyword `buffer`. To display the total buffer statistics for the stack unit, enter the keyword total-buffer. To display the buffer statistics for a specific unit, enter the keyword *unit* and a unit number 0 .
port	To display the buffer statistics for a specific port, enter the keyword `port` and a port number from 1 to 64.
all	Display buffer statistics for all ports
priority-group	Identifier of the priority group in the range of 0 to 7.
buffer-info	To display total buffer information for the port, enter the keywords `buffer-info`. To display a queue range, enter 0 to 14 for a specfic queue or all.

Command Modes

EXEC

EXEC Privilege

Command History

Version 9.3.0.0	Introduced on the S6000 platform.

Usage Information

The following table describes the fields in the output of the `show` command:

Field	Description
Buffer Accounting Stats for Unit 0 Port 1 priority-group 0	Displays the counters that are calculated by the buffer statistics tracking method for each port per priority group on a particular stack member.
Max Shared Limit	Maximum shared buffer space allotted to the specific port for the corresponding stack unit
Default Packet Buffer allocate for the priority-group	The default packet buffer size in KB that is associated with the particular priority group
Accounted Packet Buffer	Shared buffer space that is in use by the packets

Example

```
FTOS# show hardware stack-unit 0 buffer unit 0 port 1 priority-
group 0 buffer-info

-----  Buffer Accounting Stats for Unit 0 Port 1 priority-
group 0 -----
 Maximum Shared Limit: 0
 Default Packet Buffer allocate for the priority-group: 61440
 Accounted Packet Buffer: 0
```

show hardware system-flow

Display Layer 3 ACL or QoS data for the selected stack member and stack member port-pipe.

S6000

Syntax

```
show hardware system-flow layer2 stack-unit id port-set number
[counters]
```

Parameters

acl | qos	For the selected stack member and stack member port-pipe, display which system flow entry the packet hits and what queue the packet takes as it dumps the raw system flow tables.
stack-unit *id*	Enter the keywords `stack-unit` to select a stack member ID. The range is 0 to 5 for the S6000.
port-set *number*	Enter the keywords `port-set` with a port-pipe number. The range is 0 to 0 for the S6000.
[counters]	(OPTIONAL) Enter the keyword `counters` to display hit counters for the selected ACL or QoS option.

Defaults none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Example

```
Dell#show hardware system-flow layer2 stack-unit 0 port-set 0
counters
-----------------------------------------------------------
EntryId Description                      #HITS
-----------------------------------------------------------
2048    STP BPDU Redirects                0
2047    LLDP BPDU Redirects               0
2045    LACP traffic Redirects            0
2044    GVRP traffic Redirects            0
2043    ARP Reply Redirects               0
2042    802.1x frames Redirects           0
2041    VRRP frames Redirects             0
2040    GRAT ARP                          0
2039    DROP Cases                        0
2038    OSPF1 STUB                        0
2037    OSPF2 STUB                        0
2036    VRRP STUB                         0
2035    L2_DST_HIT+BC MAC+VLAN 4095       0
2034    L2_DST_HIT+BC MAC                 0
2033    Catch all                         0
384     OSPF[224.0.0.5] Packets           0
383     OSPF[224.0.0.6] Packets           0
382     VRRP Packets                      0
380     BCast L2_DST_HIT on VLAN 4095 0
379     BCAST L2_DST_HIT Packets          0
4       Unknown L2MC Packets              0
3       L2DLF Packets                     0
2       L2UCAST Packets                   0
1       L2BCASTPackets                    0
25
Dell#
```

Example

```
param1=0(0x00)},
   action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
   action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
   action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
   meter=NULL,
   counter={idx=1, mode=0x01, entries=1}

############## FP Entry for redirecting LACP traffic to CPU
Port ############
```

```
   EID 2045: gid=1,
   slice=15, slice_idx=0x02, prio=0x7fd, flags=0x82, Installed
   tcam: color_indep=0, higig=0, higig_mask=0,
   KEY=0x00000000 00000000 00000000 0180c200 00020000 00000000
00000000
, FPF4=0x00
   MASK=0x00000000 00000000 00000000 ffffffff ffff0000
00000000 00000000
,       0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
    meter=NULL,
    counter={idx=2, mode=0x01, entries=1}

################# FP Entry for redirecting GVRP traffic to RSM
###########
    EID 2044: gid=1,
    slice=15, slice_idx=0x03, prio=0x7fc, flags=0x82, Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
KEY=0x00000000 00000000 00000000 0180c200 00210000 00000000
00000000
, FPF4=0x00
MASK=0x00000000 00000000 00000000 ffffffff ffff0000 00000000
00000000
,    0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=7(0x07), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
    meter=NULL,
    counter={idx=3, mode=0x01, entries=1}

################# FP Entry for redirecting ARP Replies to RSM
#############
    EID 2043: gid=1,
    slice=15, slice_idx=0x04, prio=0x7fb, flags=0x82, Installed
    tcam: color_indep=0, higig=0, higig_mask=0,
KEY=0x00000000 00000000 00000000 00000000 00000000 00000806
00001600
, FPF4=0x00
MASK=0x00000000 00000000 00000000 00000000 00000000 0000ffff
00001600
,    0x00
    action={act=Drop, param0=0(0x00), param1=0(0x00)},
    action={act=CosQCpuNew, param0=6(0x06), param1=0(0x00)},
    action={act=CopyToCpu, param0=0(0x00), param1=0(0x00)},
    action={act=UpdateCounter, param0=1(0x01), param1=0(0x00)},
!--------- output truncated -----------------!
```

show hardware stack-unit buffer-stats-snapshot

View the buffer statistics tracking resource information without polling details and historical snapshots. This command is supported on the S6000 platform.

Syntax

```
show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource X
```

Parameters

stack-unit *number*	Unique ID of the stack unit to select a particular stack member and then enter one of the following command options to display a collection of data based on the option entered. The range is 0 to 11.
buffer-stats-snapshot unit *number*	Display the historical snapshot of buffer statistical values unit Enter the keyword `unit` along with a port-pipe number, then the keyword counters to display the counters on the selected port-pipe. The range is 0 to 0.
port	resource X Buffer and traffic manager resources usage, where X can be one of the following: • All - Ingress and Egress resources snapshots • Port {id |all} queue {all} - egress queue-level snapshot for both unicast and multicast packets • Port {id |all} queue ucast {id | all} - egress queue-level snapshot for unicast packets only • Port {id |all} queue mcast {id | all} - egress queue-level snapshot for multicast packets only • Port {id |all} prio-group {id | all} - ingress priority-group level snapshot

Command Modes

EXEC

EXEC Privilege

Command History

Version 9.3.0.0	Introduced on the S6000 platform.

Usage Information

The following information is displayed depending on whether the historical snapshot of buffer statistics is needed for all ports, per-port per-queue, or a priority group.

- All – Displays all resources on ingress and egress for each of the port, queue.
- Port-Queue ucast/mcast – Displays the total unicast/multicast buffer usage on per-port per-queue basis. For CPU port, counters for queues 0 – 11 are displayed and no differentiation is made between unicast and multicast queues.
- Port- Priority-Group – Displays the shared space counters usage, head-room space counters per ingress port on per-priority- group granularity.

When the buffer-stats-snapshot is disabled, an informational message is dispayed to this effect when you attempt to view the buffer statistics tracking resource information without polling details and historical snapshots.

Example

```
FTOS#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 1 queue ucast all
Stack-unit: 0 unit: 0 port: 1 (interface Fo 0/0)
---------------------------------------
```

```
Q# TYPE     Q#     TOTAL BUFFERED CELLS
---------------------------------------
UCAST       0      0
UCAST       1      0
UCAST       2      0
UCAST       3      0
UCAST       4      0
UCAST       5      0
UCAST       6      0
UCAST       7      0
UCAST       8      0
UCAST       9      0
UCAST       10     0
UCAST       11     0


FTOS#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 5 queue all

Stack-unit 0 unit 0 port 5 (interface te 0/4)

----------------------------------------------------------------
-------------------------------------------------
Q# TYPE     Q#      TOTAL BUFFERED CELLS
----------------------------------------------------------------
-------------------------------------------------
UCAST        5                   4
UCAST        6                   8
UCAST        11                 1
MCAST       4                    11
```

Only the queues for which the buffer cell consumption is not zero are displayed. If an egress buffer is not present on any of the queues on port 5, the following sample output is displayed:

```
FTOS#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 5 queue all

Stack-unit 0 unit 0 port 5 (interface te 0/4)


----------------------------------------------------------------
-------------------------------------------------
Q# TYPE     Q#      TOTAL BUFFERED CELLS
----------------------------------------------------------------
--------------------------------------------------

FTOS#show hardware stack-unit 0 buffer-stats-snapshot unit 0
resource port 5 prio-group all

Stack-unit 0 unit 0 port 5 (interface te 0/4)

----------------------------------------------------------------
-------------------------------------------------
PG#     SHARED CELLS      HEADROOM CELLS
----------------------------------------------------------------
-------------------------------------------------
6          1000
5
```

```
                 7              3                                    0
```

show hardware stack-unit buffer-stats-snapshot (Total Buffer Information)

View the buffer statistics tracking resource information depending on the type of buffer information, such as device-level details, port-level counters, queue-based snapshots, or priority group-level snapshot in the egress and ingress direction of traffic. This command is supported on the S6000 platform.

Syntax

```
show hardware stack-unit <0-11> buffer-stats-snapshot unit <0-
0> buffer-info x
```

Parameters

stack-unit <*0–11*>	Unique ID of the stack unit to select a particular stack member and then enter one of the following command options to display a collection of data based on the option entered. The range is 0 to 11.
buffer-stats-snapshot unit *number*	Display the historical snapshot of buffer statistical values unit Enter the keyword `unit` along with a port-pipe number, then the keyword counters to display the counters on the selected port-pipe. The range is 0 to 0.
buffer-info	buffer-info Displays total buffer information for a group, where *x* can be one of the following: • All - Displays ingress and egress device, port, and queue snapshots • Port {id |all} Displays both ingress and egress port-level snapshot • Port ingress {id |all} Displays ingress port-level snapshot • Port egress {id |all) Displays egress port-level snapshot • Port {id |all} queue {all} - egress queue-level snapshot for both unicast and multicast packets • Port {id |all} queue ucast {id | all} - egress queue-level snapshot for unicast packets only • Port {id |all} queue mcast {id | all} - egress queue-level snapshot for multicast packets only • Port {id |all} prio-group {id | all} - ingress priority-group level snapshot

Command Modes

EXEC

EXEC Privilege

Command History

Version 9.3.0.0	Introduced on the S6000 platform.

Usage Information

The following information is displayed based on the buffer-info type, such as device-level details, port-level counters, queue-based snapshots, or priority group-level snapshot in the egress and ingress direction of traffic:

- Device-ingress – Displays total buffer accounting usage for the unit.
- Device-egress –Display total buffer usage for the unit, total multicast buffer usage for the unit and also on per-service-pool basis. Counters will be displayed for the 2 service-pools – one for normal traffic and other for DCB traffic.
- Port-ingress – Displays the total buffer accounting usage for the ingress port.
- Port-egress – Displays the total unicast buffer usage, total multicast buffer usage separately for the egress port.
- Port-Queue ucast/mcast – Displays the total unicast/multicast buffer usage on per-port per-queue basis. For CPU port, counters for queues 0 – 11 will be displayed and there is no differentiation between unicast and multicast queues.
- Port- Priority-Group – Displays the shared space usage counters usage, head-room space counters per ingress port on per-priority-group granularity.

When the buffer-stats-snapshot is disabled, the folloing informational message is displayed when you run the show command: `%Info: Buffer-stats-snapshot feature is disabled.`

14

Dynamic Host Configuration Protocol (DHCP)

Dynamic host configuration protocol (DHCP) is an application layer protocol that dynamically assigns IP addresses and other configuration parameters to network end-stations (hosts) based on the configuration policies the network administrators determine.

The Dell Networking operating system supports the basic DHCP commands on the S6000 platform.

This chapter contains the following sections:

- Commands to Configure the System to be a DHCP Server
- Commands to Configure Secure DHCP

Commands to Configure the System to be a DHCP Server

To configure the system to be a DHCP server, use the following commands.

clear ip dhcp

Reset the DHCP counters.

S6000

Syntax	`clear ip dhcp [binding {`*`address`*`}	conflict	server statistics]`

Parameters

binding	Enter the keyword `binding` to delete all entries in the binding table.
address	Enter the IP address to clear the binding entry for a single IP address.
conflicts	Enter the keyword `conflicts` to delete all of the log entries created for IP address conflicts.
server statistics	Enter the keywords `server statistics` to clear all the server counter information.

Defaults	none
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

Usage Information

Entering <CR> after the `clear ip dhcp binding` command clears all the IPs from the binding table.

debug ip dhcp server

Display FTOS debugging messages for DHCP.

S6000

Syntax

```
debug ip dhcp server [events | packets]
```

Parameters

events	Enter the keyword `events` to display the DHCP state changes.
packet	Enter the keyword `packet` to display packet transmission/ reception.

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

default-router

Assign a default gateway to clients based on the address pool.

S6000

Syntax `default-router address [address2...address8]`

Parameters

address	Enter a list of routers that may be the default gateway for clients on the subnet. You may specify up to eight routers. List them in order of preference.

Defaults none

Command Modes DHCP <POOL>

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

disable

Disable the DHCP server.

S6000

Syntax `disable`

DHCP Server is disabled by default. To enable the system to be a DHCP server, use the `no disable` command.

Defaults Disabled

Command Modes CONFIGURATION

DHCP <POOL>

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

dns-server

Assign a DNS server to clients based on address pool.

S6000

Syntax `dns-server address [address2...address8]`

Parameters

address	Enter a list of DNS servers that may service clients on the subnet. You may list up to eight servers, in order of preference.

Defaults none

Command Modes DHCP <POOL>

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

domain-name

Assign a domain to clients based on the address pool.

S6000

Syntax `domain-name name`

Parameters

name	Give a name to the group of addresses in a pool.

Defaults	none
Command Modes	DHCP <POOL>
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

excluded-address

Prevent the server from leasing an address or range of addresses in the pool.

S6000

Syntax

```
excluded-address [address | low-address high-address]
```

Parameters

address	Enter a single address to be excluded from the pool.
low-address	Enter the lowest address in a range of addresses to be excluded from the pool.
high-address	Enter the highest address in a range of addresses to be excluded from the pool.

Defaults	none
Command Modes	DHCP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.2.1.0	Introduced on the C-Series and S-Series.

hardware-address

For manual configurations, specify the client hardware address.

S6000

Syntax	`hardware-address address`
Parameters	*address* — Enter the hardware address of the client.
Defaults	none
Command Modes	DHCP <POOL>
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

host

For manual (rather than automatic) configurations, assign a host to a single-address pool.

S6000

Syntax	`host address`
Parameters	*address/mask* — Enter the host IP address and subnet mask.
Defaults	none
Command Modes	DHCP <POOL>
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

lease

Specify a lease time for the addresses in a pool.

S6000

Syntax `lease {days [hours] [minutes] | infinite}`

Parameters

days	Enter the number of days of the lease. The range is from 0 to 31.
hours	Enter the number of hours of the lease. The range is from 0 to 23.
minutes	Enter the number of minutes of the lease. The range is from 0 to 59.
infinite	Specify that the lease never expires.

Defaults **24 hours**

Command Modes DHCP <POOL>

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

netbios-name-server

Specify the NetBIOS Windows Internet Naming Service (WINS) name servers, in order of preference, that are available to Microsoft Dynamic Host Configuration Protocol (DHCP) clients.

S6000

Syntax	`netbios-name-server` *`address`* `[`*`address2...address8`*`]`
Parameters	

address	Enter the address of the NETBIOS name server. You may enter up to eight, in order of preference.

Defaults	none
Command Modes	DHCP <POOL>
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

netbios-node-type

Specify the NetBIOS node type for a Microsoft DHCP client. Dell Networking recommends specifying clients as `hybrid`.

S6000

Syntax	`netbios-node-type` *`type`*
Parameters	

type	Enter the NETBIOS node type: • Broadcast: Enter the keyword `b-node`. • Hybrid: Enter the keyword `h-node`. • Mixed: Enter the keyword `m-node`. • Peer-to-peer: Enter the keyword `p-node`.

Defaults	**Hybrid**

Command Modes	DHCP <POOL>
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

network

Specify the range of addresses in an address pool.

S6000

Syntax

```
network network /prefix-length
```

Parameters

network/ prefix-length	Specify a range of addresses. Prefix-length range is from 17 to 31.

Defaults	none
Command Modes	DHCP <POOL>
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

pool

Create an address pool.

S6000

Syntax	`pool name`
Parameters	*name* — Enter the address pool's identifying name.
Defaults	none
Command Modes	DHCP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

show ip dhcp binding

Display the DHCP binding table.

S6000

Syntax	`show ip dhcp binding`
Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

show ip dhcp configuration

Display the DHCP configuration.

S6000

Syntax

```
show ip dhcp configuration [global | pool name]
```

Parameters

pool *name*	Display the configuration for a DHCP pool.
global	Display the DHCP configuration for the entire system.

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

show ip dhcp conflict

Display the address conflict log.

S6000

Syntax

```
show ip dhcp conflict address
```

Parameters

address	Display a particular conflict log entry.

Defaults

none

Command Modes

EXEC Privilege

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

show ip dhcp server

Display the DHCP server statistics.

S6000

Syntax	`show ip dhcp server statistics`
Defaults	none
Command Modes	EXEC Privilege
Command History	

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

Commands to Configure Secure DHCP

DHCP, as defined by RFC 2131, provides no authentication or security mechanisms. Secure DHCP is a suite of features that protects networks that use dynamic address allocation from spoofing and attacks.

arp inspection

Enable dynamic arp inspection (DAI) on a VLAN.

S6000

Syntax	`arp inspection`

Defaults	Disabled
Command Modes	INTERFACE VLAN
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

Related Commands

arp inspection-trust — specifies a port as trusted so that ARP frames are not validated against the binding table.

arp inspection-trust

Specify a port as trusted so that ARP frames are not validated against the binding table.

S6000

Syntax	`arp inspection-trust`
Defaults	Disabled
Command Modes	INTERFACE INTERFACE PORT-CHANNEL
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

Related Commands	arp inspection — enables dynamic ARP inspection on a VLAN.

clear ip dhcp snooping

Clear the DHCP binding table.

S6000

Syntax	`clear ip dhcp snooping binding`
Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

Related Commands	show ip dhcp snooping — displays the contents of the DHCP binding table.

ip dhcp snooping

Enable DHCP snooping globally.

S6000

Syntax	`[no] ip dhcp snooping`
Defaults	Disabled
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 9.2.(0.0)	Introduced on the S4810 and S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced on the E-Series.
Version 8.2.1.0	Introduced on the C-Series and S-Series on Layer 2 interfaces.
Version 7.8.1.0	Introduced on the C-Series and S-Series on Layer 3 interfaces.

Usage Information

When enabled, no learning takes place until you enable snooping on a VLAN. After disabling DHCP snooping, the binding table deletes and Option 82, IP Source Guard, and Dynamic ARP Inspection are disabled.

Introduced in Dell Networking OS version 7.8.1.0, DHCP snooping was available for Layer 3 only and dependent on DHCP Relay Agent (`ip helper-address`). Dell Networking OS version 8.2.1.0 extends DHCP Snooping to Layer 2. You do not have to enable relay agent to snoop on Layer 2 interfaces.

ip dhcp snooping binding

Create a static entry in the DHCP binding table.

S6000

Syntax

```
[no] ip dhcp snooping binding mac address vlan-id vlan-id ip
ip-address interface type slot/port lease number
```

Parameters

mac *address*	Enter the keyword `mac` then the MAC address of the host to which the server is leasing the IP address.
vlan-id *vlan-id*	Enter the keywords `vlan-id` then the VLAN to which the host belongs. The range is from 2 to 4094.
ip *ip-address*	Enter the keyword `ip` then the IP address that the server is leasing.
interface *type*	Enter the keyword `interface` then the type of interface to which the host is connected: • For an 10/100 Ethernet interface, enter the keyword `fastethernet`. • For a Gigabit Ethernet interface, enter the keyword `gigabitethernet`. • For a Ten-Gigabit Ethernet interface, enter the keyword `tengigabitethernet`. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE`.
slot/port	Enter the slot and port number of the interface.

lease *time*	Enter the keyword `lease` then the amount of time the IP address are leased. The range is from 1 to 4294967295.

Defaults	none
Command Modes	- EXEC - EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

show ip dhcp snooping — displays the contents of the DHCP binding table.

ip dhcp snooping database renew

Renew the binding table.

S6000

Syntax	`ip dhcp snooping database renew`
Defaults	none
Command Modes	- EXEC - EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping trust

Configure an interface as trusted.

S6000

Syntax `[no] ip dhcp snooping trust`

Defaults **Untrusted**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp source-address-validation

Enable the IP Source Guard.

S6000

Syntax `[no] ip dhcp source-address-validation [ipmac]`

Parameters

ipmac	Enable IP+MAC Source Address Validation.

Defaults Disabled

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 8.2.1.0	Added the keyword `ipmac`.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

Allocate at least one FP block to `ipmacacl` before you can enable IP+MAC Source Address Validation.

1. Use the `cam-acl l2acl` command from CONFIGURATION mode.
2. Save the running-config to the startup-config.
3. Reload the system.

ip dhcp relay information-option

Enable Option 82.

S6000

Syntax

```
ip dhcp relay information-option [trust-downstream] [vpn]
```

Parameters

trust-downstream	Configure the system to trust Option 82 when it is received from the previous-hop router.
vpn	Enter the keyword `vpn` to add VPN/VRF related sub-option to relay agent information Option 82. **NOTE:** Adds the VPN/VRF related sub-options into the relay agent information option(82). When DHCP broadcasts are forwarded by the relay agent from clients to DHCP server.

Default

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 7.8.1.0	Introduced on C-Series and S-Series.

Example

```
Dell(conf)#ip dhcp relay information-option vpn
```

ip dhcp snooping verify mac-address

Validate a DHCP packet's source hardware address against the client hardware address field (CHADDR) in the payload.

S6000

Syntax

```
[no] ip dhcp snooping verify mac-address
```

Defaults Disabled

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 7.2.1.0	Introduced on the C-Series and S-Series.

ip helper-address

Configures the destination broadcast address or the host address for DHCP server requests.

Syntax

```
ip helper-address [vrf vrf-name] ip-address
```

To disable the destination broadcast address or the host address for DHCP server requests, use the `ip helper-address [vrf vrf-name] ip-address` command.

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF through which the host address can be reached.
ip-address	Enter an IP address through which the host address can be reached.

Default Disabled.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command on the interfaces where the DHCP clients are connected to forward the packets from clients to DHCP server and vice-versa.

Example

```
Dell(conf-if-fo-0/124)#ip helper-address vrf jay 10.0.0.2
```

show ip dhcp snooping

Display the contents of the DHCP binding table or display the interfaces configured with IP Source Guard.

S6000

Syntax

```
show ip dhcp snooping [binding | source-address-validation]
```

Parameters

binding	Display the binding table.
source-address-validation	Display the interfaces configured with IP Source Guard.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the E-Series.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Commands to Configure DNS

To configure the Domain Names Systems (DNS) on the system, use the following commands:

ip name-server

Configures the name server IP addresses for VRF. Using this command, you can configure up to a maximum of six IP addresses per VRF.

Syntax

```
ip name-server [vrf vrf-name] ip-address [ip-address2] [ip-address3] [ip-address4] [ip-address5] [ip-address6]
```

To undo the name server ip address configuration for VRF, use the `no ip name-server [vrf vrf-name] ip-address` command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to configure the name server IP addresses for that VRF.
ip-address [*ip-address2*] [*ip-address3*] [*ip-address4*] [*ip-address5*] [*ip-address6*]	Enter the IP address of the name server in dotted decimal format. NOTE: Use the additional `ip-address` parameters (`ip-address2` to `ip-address6`) in a sequential order to specify up to a maximum of six IP addresses per VRF.

Defaults	None
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command. Version 9.4.(0.0) — Introduced on the S-Series and Z-Series.
Usage Information	Use this command to associate name server IP addresses to a specific VRF.

Example

```
•    Dell(conf)#ip name-server vrf jay 2.2.2.2
•    Dell(conf)#ip name-server vrf jay 2.2.2.2 3.3.3.3 4.4.4.4
5.5.5.5 6.6.6.6 7.7.7.7
```

ip domain-name

Configures the default domain corresponding to a specific VRF. This domain is appended to the in complete DNS requests corresponding to the specified VRF.

Syntax

`ip domain-name [vrf vrf-name] name`

To undo the domain name configuration corresponding to a specific VRF, use the `no ip domain-name [vrf vrf-name] name` command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to configure the domain corresponding to that VRF.
name	Enter the name of the domain to be appended to the in complete DNS requests corresponding to the specified VRF.

Defaults	None
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command. Version 9.4.(0.0) — Introduced on the S-Series and Z-Series.

Usage Information	Use this command to configure a domain name corresponding to a VRF. This domain is appended to the in complete DNS requests corresponding to the specified VRF.
Example	`Dell(conf)#ip domain-name vrf jay dell.com`

ip domain-list

Adds a domain name to the DNS list. This domain name is appended to incomplete host names in DNS requests corresponding to a specific VRF.

Syntax

`ip domain-list [vrf` *`vrf-name`*`]` *`name`*

To remove a domain name from DNS list, use the `no ip domain-list [vrf` *`vrf-name`*`]` *`name`* command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to add a domain name to the DNS list corresponding to that VRF.
name	Enter the name of the domain to be appended to the DNS list corresponding to the VRF.

Defaults

None

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command to add domain names to the DNS lists corresponding to a specific VRF. You can add up to a maximum of six domain names to the DNS list corresponding to a VRF. This domain is used to complete the unqualified host names.

Example

```
Dell(conf)#ip domain-list  vrf jay dell.com
Dell(conf)#ip domain-list  vrf jay force10.com
```

ip host

Configures a mapping between the host name server and the IP address for a specific VRF. This mapping information is used by the name-to-IP address table to resolve host names.

Syntax

```
ip host [vrf vrf-name] name ip-address
```

To undo the host name server to IP address mapping for VRFs, use the `no ip host [vrf vrf-name] name ip-address` command.

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to configure the name server to IP address mapping for that VRF.
name	Enter the name od the host to be associated with an IP address.
ip-address	Enter the IP address of the name server in dotted decimal format.

Defaults

None

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command to create a mapping between a host name server and its IP addresses for a specific VRF.

Example

```
Dell(conf)#ip host vrf jay dell 1.1.1.1
```

clear host

Removes one or all dynamically learned host table entries for a specific VRF.

Syntax

```
clear host [vrf vrf-name] {* | host-name}
```

Parameters

vrf *vrf-name*	(Optional) Enter the key word `vrf` and then the name of the VRF to delete dynamically learned host table entries corresponding to that VRF.

host-name	Enter the name of the host corresponding to which you want to delete the dynamically learnt host table entries.
*	Enter * to delete all host table entries.

Defaults	None
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information	Use this command to delete one or all dynamically learned host table entries corresponding to a specific VRF.

Example

```
Dell#clear host vrf jay dell
Dell#clear host  vrf jay *
```

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Equal Cost Multi-Path (ECMP)

Equal cost multi-path (ECMP) is supported on the Dell Networking S6000 platform.

ecmp-group

Provides a mechanism to monitor traffic distribution on an ECMP link bundle. A system log is generated when the standard deviation of traffic distribution on a member link exceeds a defined threshold.

S6000

Syntax

```
ecmp-group {ecmp-group-id interface interface | link-bundle-monitor}
```

To remove the selected interface, use the `ecmp-group no interface` command.

To disable link bundle monitoring, use the `ecmp-group no link-bundle-monitor` command.

Parameters

ecmp-group ID	Enter the identifier number for the ECMP group. The range is from 2 to 64.
interface	Enter the following keywords and slot/port to add the interface to the ECMP group: • 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information • For a LAG interface, enter the keywords `port-channel` then the slot/port information. The range is from 1 to 128.

Defaults

Off

Command Modes

- CONFIGURATION
- CONFIGURATION ECMP-GROUP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.10.0	Introduced on the S4810.

Usage Information

Using CONFIGURATION mode, create an ECMP group ID. You can then assign interfaces to the ECMP group using CONFIGURATION ECMP-GROUP mode. You can also enable on the port-channel configuration using the CONFIGURATION ECMP-GROUP command mode.

hash-algorithm

Changes the hash algorithm used to distribute traffic flows across a Port Channel. The ECMP and LAG options are supported on the Z-Series.

S6000

Syntax

```
hash-algorithm {algorithm-number | {ecmp {crc16 | crc16cc |
crc32MSB | crc32LSB | crc-upper | dest-ip | lsb | xor1 | xor2 |
xor4 | xor8 | xor16} [number] hg {crc16 | crc16cc | crc32MSB |
crc32LSB | xor1 | xor2 | xor4 | xor8 | xor16} stack-unit stack-
unit-number | port-set port-pipe | hg-seed seed-value stack-
unit | lag {checksum | crc | xor} [number] nh-ecmp {checksum |
crc | xor}[number] stack—unit number ip-sa-mask value ip-da-
mask value | seed seed-value }
```

To return to the default hash algorithm, use the `no hash-algorithm` command.

To return to the default ECMP hash algorithm, use the `no hash-algorithm ecmp` *algorithm-value* command.

To remove the hash algorithm on a particular stack-unit, use the `no hash-algorithm linecard` *number* command.

Parameters

algorithm-number	Enter the algorithm number. The range is from 0 to 47.

ecmp *crc16* | *crc16cc* | *crc32MSB* | *crc32LSB* | *crc-upper* | *dest-ip* | *lsb* | *xor1* | *xor2* | *xor4* | *xor8* | *xor16*	TeraScale and ExaScale Only: Enter the keyword `ecmp` then one of the following options: • *`crc16`*: Use CRC16_BISYNC — 16 bit CRC16-bisync polynomial (default) • *`crc16cc`*: Use CRC16_CCITT — 16 bit CRC16 using CRC16-CCITT polynomial • *`crc32MSB`*: Use CRC32_UPPER — MSB 16 bits of computed CRC32 • *`crc32LSB`*: Use CRC32_LOWER — LSB 16 bits of computed CRC32 • *`crc-upper`*: Uses the upper 32 bits of the key for the hash computation • *`dest-ip`*: Uses the destination IP for ECMP hashing • *`lsb`*: Returns the LSB of the key as the hash • *`xor1`*: Use CRC16_BISYNC_AND_XOR1 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor1 • *`xor2`*: Use CRC16_BISYNC_AND_XOR2 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor2 • *`xor4`*: Use CRC16_BISYNC_AND_XOR4 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor4 • *`xor8`*: Use CRC16_BISYNC_AND_XOR8 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor8 • *`xor16`*: Use CR16 — 16 bit XOR
hg {*crc16* | *crc16cc* | *crc32MSB* | *crc32LSB* | *xor1* | *xor2* | *xor4* | *xor8* | *xor16*} stack-unit *stack-unit-number* | port-set *port-pipe*	Z-Series only: Enter the keyword `hg` then one of the following options: • *`crc16`*: Use CRC16_BISYNC — 16 bit CRC16-bisync polynomial (default) • *`crc16cc`*: Use CRC16_CCITT — 16 bit CRC16 using CRC16-CCITT polynomial • *`crc32MSB`*: Use CRC32_UPPER — MSB 16 bits of computed CRC32 • *`crc32LSB`*: Use CRC32_LOWER — LSB 16 bits of computed CRC32 • *`xor1`*: Use CRC16_BISYNC_AND_XOR1 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor1 • *`xor2`*: Use CRC16_BISYNC_AND_XOR2 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor2 • *`xor4`*: Use CRC16_BISYNC_AND_XOR4 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor4 • *`xor8`*: Use CRC16_BISYNC_AND_XOR8 — Upper 8 bits of CRC16-BISYNC and lower 8 bits of xor8 • *`xor16`*: Use CR16 — 16 bit XOR Enter the keywords `stack-unit`, then a stack-unit number, to specify a stack-unit. The range is from 0 to 7.

	Enter the keywords `port-set` *`port-pipe`* then the port pipe number. The range is from 0 to 5.
hg-seed *seed-value stack-unit*	Z-Series only: Enter the keywords `hg-seed` then the hash algorithm seed value. The range is from 0 to 2147483646. Enter the keywords `stack-unit` then the stack unit number. The range is from 0 to 7. Enter the keywords `port-set` then the stack-unit port-pipe number. The range is from 0 to 5.
lag *hash algorithm*	Z-Series only: Enter the keywords `hg-seed` . The range is from 0 to 47.
nh-ecmp *hashalgorithm value*	(OPTIONAL) Enter the keyword **nh-ecmp** followed by the ECMP hash algorithm value.
stack-unit *number*	(OPTIONAL) : Enter the keyword**stack—unit** followed by the stack—unit slot number.
ip-sa-mask *value*	(OPTIONAL) Enter the keyword **ip-sa-mask** followed by the ECMP/LAG hash mask value. The range is from 0 to FF.
ip-da-mask *value*	(OPTIONAL) Enter the keyword **ip-da-mask** followed by the ECMP/LAG hash mask value. The range is from 0 to FF.

Defaults	IPSA and IPDA mask value is **FF** for the stack-unit.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Added the `nh-ecmp` option.

Version 7.7.1.1	Added the `nh-ecmp` option.

Usage Information

To ensure that CRC is not used for LAG, set the default hash-algorithm method on ExaScale systems. For example,`hash-algorithm ecmp xor lag checksum nh-ecmp checksum.`

The hash value calculated with the hash-algorithm command is unique to the entire chassis. The hash algorithm command with the stack—unit option changes the hash for a particular stack—unit by applying the mask specified in the IPSA and IPDA fields.

The stack-unit option is applicable with the lag-hash-align microcode only. Any other microcode returns an error message as follows:

- `Dell(conf)#hash-algorithm linecard 5 ip-sa-mask ff ip-da-mask ff`
- `% Error: This command is not supported in the current microcode configuration`

In addition, the `linecard` *`number`* `ip-sa-mask` *`value`* `ip-da-mask` *`value`* option has the following behavior to maintain bi-directionality:

- When hashing is done on both IPSA and IPDA, the `ip-sa-mask` and `ip-da-mask` values must be equal. (Single Linecard).
- When hashing is done only on IPSA or IPDA, Dell Networking OS maintains bi-directionality with masks set to XX 00 for stack-unit 1 and 00 XX for stack-unit 2 (`ip-sa-mask` and `ip-da-mask`). The mask value must be the same for both stack-units when using multiple stack-units as ingress (where XX is any value from 00 to FF for both stack-units). For example, assume that traffic is flowing between linecard 1 and linecard 2:
- `hash-algorithm linecard 1 ip-sa-mask aa ip-da-mask 00`
- `hash-algorithm linecard 2 ip-sa-mask 00 ip-da-mask aa`

The different hash algorithms are based on the number of Port Channel members and packet values. The default hash algorithm (number 0) yields the most balanced results in various test scenarios, but if the default algorithm does not provide a satisfactory distribution of traffic, use the hash-algorithm command to designate another algorithm.

When a Port Channel member leaves or is added to the Port Channel, the hash algorithm is recalculated to balance traffic across the members.

ip ecmp-group

Enable and specify the maximum number of ecmp that the L3 CAM hold for a route, By default, when maximum paths are not configured, the CAM can hold a maximum of 16 ecmp per route.

S6000

Syntax	`ip ecmp-group {maximum-paths	{number} {path-fallback}` To negate a command, use the `no ip ecmp-group maximum-paths {number}` command.
Parameters	**maximum-paths**: Specify the maximum number of ECMP for a route. The range is 2 to 64. **path-fallback**: Use the keywords `path-fallback` to enable this feature. If you enable the feature, re-enter this keyword to disable the feature.
Defaults	16
Command Modes	CONFIGURATION
Command History	Version 9.0.2.0: Introduced on the S6000. Version 9.0.0.0: Introduced on the Z9000. Version 8.3.10.0: Introduced on the S4810.
Usage Information	You must save the new ECMP settings to the startup-config (`write-mem`) then reload the system for the new settings to take effect.
Related Commands	show ip cam stack-unit – Display content-addressable memory (CAM) entries for an S-Series switch.

link-bundle-distribution trigger-threshold

Provides a mechanism to set the threshold to trigger when traffic distribution begins being monitored on an ECMP link bundle.

S6000

Syntax	`link-bundle-distribution trigger-threshold [percent]` To exit from ecmp group mode, use the `exit` command.

Parameters

percent	Indicate the threshold value when traffic distribution starts being monitored on an ECMP link bundle. The range is from 1 to 90%. The default is **60%**.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.10.0	Introduced on the S4810.

link-bundle-monitor enable

Provides a mechanism to enable monitoring of traffic distribution on an ECMP link bundle.

S6000

Syntax

```
link-bundle-monitor enable
```

To exit from ECMP group mode, use the `exit` command.

Command Modes

- ECMP-GROUP
- PORT-CHANNEL INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.10.0	Introduced on the S4810.

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Flex Hash and Optimized Boot-Up

This chapter describes the Flex Hash and fast-boot enhancements.

load-balance ingress-port enable

Enable the Flex hash functionality. This utility is supported on the S6000 platform.

Syntax

```
load-balance ingress-port enable
```

To disable the Flex hash capability, use the **no** version of this command.

Default

None

Command Modes

CONFIGURATION mode

Command History

Version 9.3(0.0)	Introduced on the S6000 platform.

Usage Information

Flex hash uses the RTAG7 bins 2 and 3 (overlay bins). These bins must be enabled for Flex hash to be configured. These bins contain the source module and source port information. These bins are disabled by default in releases of Dell Networking OS earlier than Release 9.3.0.0. The default behavior of disabling of these bins occurs because of incorrect egress port information that would otherwise be displayed in the output of the diagnostic show command of `show ip flow`.

As a result, when load balancing of RRoCE packets using Flex hash is enabled, the `show ip flow` command is not functional. Similarly, when `show ip flow` command operates (ingress port based load balancing is disabled) the hashing of RRoCE packets is not operational.

Flex hash APIs do not mask out unwanted byte values after extraction of the data from the Layer 4 headers for the offset value.

Example

```
Dell#load-balance ingress-port enable
```

load-balance flexhash

Specify the parameters for the Flex Hash mechanism, such as whether IPv4 or IPv6 packets must be subject to Flex Hash functionality, a unique protocol number, the offset of hash fields from the start of the L4 header to be used for hash calculation, and a meaningful description to associate the protocol number with the name. This utility is supported on the S6000 platform.

Syntax

`load-balance flexhash ipv4/ipv6 ip-proto <protocol number> <description string> offset1 <offset1 value> [offset2 <offset2 value>]`

To disable the Flex hash settings, use the `no load-balance flexhash ipv4/ipv6 ip-proto protocol number` command.

Parameters

ipv4	Denotes whether Flex Hash needs to be enabled for IPv4 packets.
ipv6	Denotes whether Flex Hash needs to be enabled for IPv6 packets.
protocol number	Represents the Outer IPv4 protocol field in case of IPv4 packets, and the Outer IPv6 next header field in case of IPv6 packets. The `ipv4/ipv6` keyword and the IP protocol value are used as keys to identify if a duplicate flex hash configuration is already present. Duplicate flex hash configuration is not possible. To change an existing flex hash configuration, you must delete the existing flex hash attribute and configure the flex attribute afresh.
description string	A description string is followed by the protocol number to enable you to associate the protocol number with the protocol name in an easily-identifiable way. For example, for a protocol number of 254, you can specify the description as RRoCE.
offset1 *value*	Specify the byte offset from the start of the L4 header from which the 2-byte data is extracted and be used in hash computation. You must enter the offset as an even number. The offset range is 0 – 30 bytes from start of L4 header.
offset2 *value*	(Optional) Specify the additional 2 bytes that must be extracted from the start of the L4 header to be used for hash computation. You must enter the offset as an even number. The offset range is 0 – 30 bytes from start of L4 header.

Default

None

Command Modes

CONFIGURATION mode

Command History

Version 9.3(0.0)	Introduced on the S6000 platform.

Usage Information

With the introduction of various overlay technologies such as network virtualization using generic routing encapsulation (NVGRE) segments and Routable Remote Direct Memory Access (RRDMA) over Converged Ethernet (RRoCE), information related to a traffic flow is contained in the L4 header. The fields in the L2 and L3 headers are not sufficient to distinguish the flows. Therefore, the fields in the L4 header are processed when hashing is performed for packets over LAG and ECMP links. The Flex Hash functionality enables you to configure a packet search key and matches packets based on the search key. When a packet matches the search key, two 16-bit hash fields are extracted from the start of the L4 header and provided as inputs (bins 2 and 3) for RTAG7 hash computation. You must specify the offset of hash fields from the start of the L4 header, which contains a flow identification field.

You can cause the system to include the fields present at the offsets that you define (from the start of the L4 header) as a part of LAG and ECMP computation. Also, you can specify whether the IPv4 or IPv6 packets must be operated with the Flex Hash mechanism.

Example

```
Dell(conf)# load-balance flexhash ipv4 ip-proto 1 desc offset1
1 offset2 2
```

reload-type fastboot

Restart the system with optimized booting-time functionality enabled. When you restart the device in fast boot mode, traffic disruption is reduced significantly and the system operations to service the data traffic are restored in a seamless way. This command is supported on the S6000 platform.

Syntax

```
reload-type fastboot
```

Parameters

fastboot	Enable the system to restart the next time with the optimized booting-time capability

Defaults By default, the device reloads in Jumpstart or BMP mode.

Command Modes GLOBAL CONFIGURATION

Command History

Version 9.3(0.0)	Added support for the `fastboot` parameter for S6000 platform.

Usage Information

You can configure an optimization technique to reduce the booting time of an S6000 Switch. This mechanism is also called fast boot. With the reduced time that is taken to reboot the switch, upon a manually-initiated reload or an expected restart of the device, the disruption in traffic that is serviced by the switch is minimized. Traffic outage is lowered considerably (reduced to approximately 25 seconds in certain network deployments) when you enable this optimization method for booting of the device. By reducing the duration of traffic loss, subscriber sessions are processed and preserved in an effective and seamless way.

lacp fast-switchover

Cause the physical ports to be aggregated faster by configuring this capability in a port-channel on both the nodes that are members of a port-channel.

S6000

Syntax	`lacp fast-switchover` To disable the capability of faster aggregation of the member ports of a LAG or a port-channel bundle, use the no version of this command.
Defaults	Not configured
Command Modes	INTERFACE (conf-if-po-number)
Command History	**Version 9.3(0.0)** Introduced on the S6000.
Usage Information	You can configure the optimal switchover functionality for LACP even if you do not enable the fast boot mode on the system. You must configure the long timeout mechanism for the LACP session to enable the fast boot capability to operate properly. This command applies to dynamic port-channel interfaces only. When applied on a static port-channel, this command has no effect. If you configure the optimized booting-time capability and perform a reload of the system, the LACP application sends PDUs across all the active LACP links immediately.
Related Commands	show lacp — displays the LACP configuration.

encapsulation dot1q

Configures lite-subinterfaces. This command is supported on the S6000 platform.

Syntax	`encapsulation dot1q` *`vlan-id`* To remove a previously configured lite-subinterface, use the `no` version of this command.
Parameters	**dot1q *vlan-id*** Enter the keyword `dot1q` followed by the VLAN ID to which the host belongs. The range is from 1 to 4094. A lite subinterface is considered as a Layer 3 port property and is synchronous with the existing rules of applying Layer 2 or Layer 3 properties to an interface.
Command Modes	INTERFACE

Command History

Version 9.3.0.0	Introduced on the S6000 platform.

Usage Information

To enable routing of RRoCE packets, the VLAN ID is mapped to the default VLAN ID of 4095 and this mapping is performed using VLAN translation. After VLAN translation, the RRoCE packets are considered in the same manner as normal IP packets that received on L3 interface and routed in the egress direction. At the egress interface, the VLAN ID is appended to the packet and transmitted out of the interface as a tagged packet with the dot1Q value preserved. The dot1Q value is preserved only for egress interfaces that are associated with a VLAN or a lite-subinterface . If a Layer 3 interface is configured without the encapsulation 802.1Q VLAN ID or is an untagged interface in a VLAN , the dot1Q value is not preserved .

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FCoE Transit

To enable the FCoE Transit feature and configure FIP snooping, use the following Dell Networking Operating System commands on the platform.

In a converged Ethernet network, a switch can operate as an intermediate Ethernet bridge to snoop on FIP packets during the login process on Fibre Channel over Ethernet (FCoE) forwarders (FCFs). Acting as a transit FIP snooping bridge, the switch uses dynamically created access control lists (ACLs) to permit only authorized FCoE traffic to transmit between an FCoE end-device and an FCF.

clear fip-snooping database interface vlan

Clear FIP snooping information on a VLAN for a specified FCoE MAC address, ENode MAC address, or FCF MAC address, and remove the corresponding ACLs FIP snooping generates.

Syntax

```
clear fip-snooping database interface vlan {vlan-id} enode
{enode-mac-address} | fcf {fcf-mac-address} | session {session-
mac-address}
```

Parameters

enode-mac-address	Enter the ENode MAC address to be cleared of FIP snooping information.
fcf-mac-address	Enter the FCF MAC address to be cleared of FIP snooping information.
session-mac-address	Enter the MAC address for the session to be cleared of FIP snooping information.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

clear fip-snooping statistics

Clears the statistics on the FIP packets snooped on all VLANs, a specified VLAN, or a specified port interface.

Syntax	`clear fip-snooping statistics [interface vlan vlan-id | interface port-type port/slot | interface port-channel port-channel-number]`

Parameters

vlan-id	Enter the VLAN ID of the FIP packet statistics to be cleared.
port-type port/slot	Enter the port-type and slot number of the FIP packet statistics to be cleared.
port-channelnumber	Enter the port channel number of the FIP packet statistics to be cleared.

Command Modes: EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

debug fip snooping

Enable debugging on FIP snooping.

Syntax	`debug fip-snooping [all | acl | error | ifm | info | ipc | tx]`

Parameters

all	Enter the keyword `all` to enable debugging on all the options.
acl	Enter the keyword `acl` for ACL-specific debugging.
error	Enter the keyword `error` for error-specific debugging.

ifm	Enter the keyword `ifm` for IFM-specific debugging.
info	Enter the keyword `info` for information-specific debugging.
ipc	Enter the keyword `ipc` for IPC-specific debugging.
tx	Enter the keyword `tx` for packet transmit-specific debugging.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Added the `tx` parameter.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

debug fip snooping rx

Enable debugging for FIP snooping receive-specific packets.

Syntax

```
debug fip-snooping rx packet-type [all | discovery | virtual-
link-instantiation | virtual-link-maintenance| vlan-discovery]
[interface]
```

Parameters

packet-type	Enter the keyword `packet-type` and then the option type on which to enable debugging. The options are: • `all` — Enter the keyword `all` to enable debugging on all the options. • `discovery` — Enter the keyword `discovery` to enable debugging on FCF advertisements and ENode solicitation. • `virtual-link-instantiation` — Enter the keywords `virtual-link-instantiation` to enable debugging on FLOGI, FDISC, and FLOGO packets. • `virtual-link-maintenance` — Enter the keywords `virtual-link-maintenance` to enable debugging on FIP clear virtual link frames and keepalives.

	• `vlan-discovery` — Enter the keywords `vlan-discovery` to enable debugging on VLAN requests and notifications.
interface	Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the S4810 and S4820T. Added the receive parameters `packet-type` and `interfaces` and their options.

feature fip-snooping

Enable FCoE transit and FIP snooping on a switch.

Syntax

`feature fip-snooping`

To disable the FCoE transit feature, use the `no feature fip-snooping` command.

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

fip-snooping enable

Enable FIP snooping on all VLANs or on a specified VLAN.

Syntax

```
fip-snooping enable
```

To disable the FIP snooping feature on all or a specified VLAN, use the `no fip-snooping enable` command.

Defaults

FIP snooping is disabled on all VLANs.

Command Modes

- CONFIGURATION
- VLAN INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

The maximum number of FCFs supported per FIP snooping-enabled VLAN is four. The maximum number of FIP snooping sessions supported per ENode server is 16.

fip-snooping fc-map

Configure the FC-MAP value FIP snooping uses on all VLANs.

Syntax

```
fip-snooping fc-map fc-map-value
```

To return the configured FM-MAP value to the default value, use the `no fip-snooping fc-map` command.

Parameters

fc-map-value	Enter the FC-MAP value FIP snooping uses. The range is from 0EFC00 to 0EFCFF.

Defaults **0x0EFC00**

Command Modes

- CONFIGURATION
- VLAN INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

fip-snooping max-sessions-per-enodemac

Configure the maximum session limit per ENode MAC address.

Syntax `fip-snooping max—sessions—per—enode—mac` *`max-sessions-value`*

To return the configured maximum sessions to the default value, use the `no fip-snooping max—sessions—per—enode—mac` command.

Parameters

max-sessions-value	Enter the maximum number of sessions allowed per ENode MAC address. The range is from 1 to 64.

Defaults **32**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the S4810 and S4820T.

fip-snooping port-mode fcf

Configure the port for bridge-to-FCF links.

Syntax	`fip-snooping port-mode fcf` To disable the bridge-to-FCF link on a port, use the `no fip-snooping port-mode fcf` command.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information	The maximum number of FCFs supported per FIP snooping-enabled VLAN is four.

fip-snooping port-mode fcoe-trusted

Configure the port for bridge-to-bridge links.

MXL Switch,

Syntax	`fip-snooping port-mode fcoe-trusted` To remove the bridge-to-bridge link configuration from the port, use the `no fip-snooping port-mode fcoe-trusted` command.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810.
Version 8.3.16.0	Introduced on MXL 10/40GbE Switch IO Module.

Usage Information

The maximum number of FCoE VLANs supported on the switch is eight.

show fip-snooping config

Display the FIP snooping status and configured FC-MAP values.

Syntax

`show fip-snooping config`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Example

```
Dell# show fip-snooping config
FIP Snooping Feature enabled Status: Enabled
FIP Snooping Global enabled Status: Enabled
Global FC-MAP Value: 0X0EFC00

FIP Snooping enabled VLANs
VLAN   Enabled   FC-MAP
----   -------   --------
100    TRUE      0X0EFC00
```

show fip-snooping enode

Display information on the ENodes in FIP-snooped sessions, including the ENode interface and MAC address, FCF MAC address, VLAN ID and FC-ID.

Syntax

`show fip-snooping enode [`*`enode-mac-address`*`]`

Parameters

enode-mac-address	Enter the MAC address of the ENodes to display.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show fip-snooping enode` command shown in the following example.

Field	Description
ENode MAC	MAC address of the ENode.
ENode Interface	Slot/ port number of the interface connected to the ENode.
FCF MAC	MAC address of the FCF.
VLAN	VLAN ID number the session uses.
FC-ID	Fibre Channel session ID the FCF assigns.

Example

```
Dell# show fip-snooping enode
Enode MAC         Enode Interface FCF MAC           VLAN FC-ID
--------- --------------- ------- ---- -----
d4:ae:52:1b:e3:cd Te 0/11        54:7f:ee:37:34:40 100
62:00:11
```

show fip-snooping fcf

Display information on the FCFs in FIP-snooped sessions, including the FCF interface and MAC address, FCF interface, VLAN ID, FC-MAP value, FKA advertisement period, and number of ENodes connected.

Syntax `show fip-snooping fcf [fcf-mac-address]`

Parameters

fcf-mac-address	Enter the MAC address of the FCF to display.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show fip-snooping fcf` command shown in the following example.

Field	Description
FCF MAC	MAC address of the FCF.
FCF Interface	Slot/port number of the interface to which the FCF is connected.
VLAN	VLAN ID number the session uses.
FC-MAP	FC-Map value the FCF advertises.
ENode Interface	Slot/ number of the interface connected to the ENode.
FKA_ADV_PERIOD	Time (in milliseconds) during which FIP keep-alive advertisements transmit.
No of ENodes	Number of ENodes connected to the FCF.
FC-ID	Fibre Channel session ID the FCF assigns.

Example

```
Dell# show fip-snooping fcf
FCF MAC        FCF Interface VLAN FC-MAP FKA_ADV_PERIOD No. of
Enodes
------- ------------- ---- ------ -------------- -------------
```

```
54:7f:ee:37:34:40 Po 22      100 0e:fc:00 4000
2
```

show fip-snooping statistics

Display statistics on the FIP packets snooped on all interfaces, including VLANs, physical ports, and port channels.

Syntax

`show fip-snooping statistics [interface vlan *vlan-id* | interface *port-type port/slot* | interface port-channel *port-channel-number*]`

Parameters

vlan-id	Enter the VLAN ID of the FIP packet statistics displays.
port-type port/ slot	Enter the port-type and slot number of the FIP packet statistics displays.
port-channel-number	Enter the port channel number of the FIP packet statistics displays.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show fip-snooping statistics` command shown in the following example.

Field	Description
Number of VLAN Requests	Number of FIP-snoop VLAN request frames received on the interface.
Number of VLAN Notifications	Number of FIP-snoop VLAN notification frames received on the interface.

Field	Description
Number of Multicast Discovery Solicits	Number of FIP-snoop multicast discovery solicit frames received on the interface.
Number of Unicast Discovery Solicits	Number of FIP-snoop unicast discovery solicit frames received on the interface.
Number of FLOGI	Number of FIP-snoop FLOGI request frames received on the interface.
Number of FDISC	Number of FIP-snoop FDISC request frames received on the interface.
Number of FLOGO	Number of FIP-snoop FLOGO frames received on the interface
Number of ENode Keep Alives	Number of FIP-snoop ENode keep-alive frames received on the interface.
Number of VN Port Keep Alives	Number of FIP-snoop VN port (Virtual N-port) keep-alive frames received on the interface
Number of Multicast Discovery Advertisements	Number of FIP-snoop multicast discovery advertisements received on the interface.
Number of Unicast Discovery Advertisements	Number of FIP-snoop unicast discovery advertisements received on the interface.
Number of FLOGI Accepts	Number of FIP FLOGI accept frames received on the interface.
Number of FLOGI Rejects	Number of FIP FLOGI reject frames received on the interface.
Number of FDISC Accepts	Number of FIP FDISC accept frames received on the interface.
Number of FDISC Rejects	Number of FIP FDISC reject frames received on the interface.
Number of FLOGO Accepts	Number of FIP FLOGO accept frames received on the interface.
Number of FLOGO Rejects	Number of FIP FLOGO reject frames received on the interface.
Number of CVLs	Number of FIP clear virtual link frames received on the interface.
Number of FCF Discovery Timeouts	Number of FCF discovery timeouts that occurred on the interface.

Field	Description
Number of VN Port Session Timeouts	Number of VN port session timeouts that occurred on the interface.
Number of Session failures due to Hardware Config	Number of session failures due to hardware configuration that occurred on the interface.

Example

```
Dell# show fip-snooping statistics interface vlan 100
Number of Vlan Requests                :0
Number of Vlan Notifications           :0
Number of Multicast Discovery Solicits :2
Number of Unicast Discovery Solicits   :0
Number of FLOGI                        :2
Number of FDISC                        :16
Number of FLOGO                        :0
Number of Enode Keep Alive             :9021
Number of VN Port Keep Alive           :3349
Number of Multicast Discovery Advertisement :4437
Number of Unicast Discovery Advertisement :2
Number of FLOGI Accepts                :2
Number of FLOGI Rejects                :0
Number of FDISC Accepts                :16
Number of FDISC Rejects                :0
Number of FLOGO Accepts                :0
Number of FLOGO Rejects                :0
Number of CVL                          :0
Number of FCF Discovery Timeouts       :0
Number of VN Port Session Timeouts     :0
Number of Session failures due to Hardware Config :0
Dell(conf)#

Dell# show fip-snooping statistics int tengigabitethernet 0/11
Number of Vlan Requests                :1
Number of Vlan Notifications           :0
Number of Multicast Discovery Solicits :1
Number of Unicast Discovery Solicits   :0
Number of FLOGI                        :1
Number of FDISC                        :16
Number of FLOGO                        :0
Number of Enode Keep Alive             :4416
Number of VN Port Keep Alive           :3136
Number of Multicast Discovery Advertisement :0
Number of Unicast Discovery Advertisement :0
Number of FLOGI Accepts                :0
Number of FLOGI Rejects                :0
Number of FDISC Accepts                :0
Number of FDISC Rejects                :0
Number of FLOGO Accepts                :0
Number of FLOGO Rejects                :0
Number of CVL                          :0
Number of FCF Discovery Timeouts       :0
Number of VN Port Session Timeouts     :0
Number of Session failures due to Hardware Config :0
```

Example (Port Channel)

```
Dell# show fip-snooping statistics interface port-channel 22
Number of Vlan Requests                :0
Number of Vlan Notifications           :2
Number of Multicast Discovery Solicits :0
Number of Unicast Discovery Solicits   :0
Number of FLOGI                        :0
Number of FDISC                        :0
Number of FLOGO                        :0
Number of Enode Keep Alive             :0
Number of VN Port Keep Alive           :0
Number of Multicast Discovery Advertisement :4451
Number of Unicast Discovery Advertisement :2
Number of FLOGI Accepts                :2
Number of FLOGI Rejects                :0
Number of FDISC Accepts                :16
Number of FDISC Rejects                :0
Number of FLOGO Accepts                :0
Number of FLOGO Rejects                :0
Number of CVL                          :0
Number of FCF Discovery Timeouts       :0
Number of VN Port Session Timeouts     :0
Number of Session failures due to Hardware Config :0
```

show fip-snooping system

Display information on the status of FIP snooping on the switch (enabled or disabled), including the number of FCoE VLANs, FCFs, ENodes, and currently active sessions.

Syntax `show fip-snooping system`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Example

```
Dell# show fip-snooping system
Global Mode : Enabled
FCOE VLAN List (Operational) : 1, 100
FCFs                         : 1
Enodes                       : 2
Sessions                     : 17
```

show fip-snooping vlan

Display information on the FCoE VLANs on which FIP snooping is enabled.

Syntax `show fip-snooping vlan`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Example

```
Dell# show fip-snooping vlan
* = Default VLAN
VLAN FC-MAP    FCFs Enodes Sessions
---- ------ ---- ------ --------
*1    -        -    -      -
100   0X0EFC00 1    2      17
```

show fips status

Display the FIPs status on the platform.

Syntax `show fips status`

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810.

18

Force10 Resilient Ring Protocol (FRRP)

Force10 resilient ring protocol (FRRP) is supported on Dell Networking S6000 platform.

FRRP is a proprietary protocol for that offers fast convergence in a Layer 2 network without having to run the spanning tree protocol (STP). The resilient ring protocol is an efficient protocol that transmits a high-speed token across a ring to verify the link status. All the intelligence is contained in the master node with practically no intelligence required of the transit mode.

Important Points to Remember

- FRRP is media- and speed-independent.
- FRRP is a Dell Networking proprietary protocol that does not interoperate with any other vendor.
- Spanning Tree must be disabled on both primary and secondary interfaces before Resilient Ring protocol is enabled.
- A VLAN configured as the control VLAN for a ring cannot be configured as a control or member VLAN for any other ring.
- Member VLANs across multiple rings are not supported in Master nodes.
- If multiple rings share one or more member VLANs, they cannot share any links between them.
- Each ring can have only one Master node; all others are Transit nodes.

clear frrp

Clear the FRRP statistics counters.

S6000

Syntax	`clear frrp [`*`ring-id`*`]`
Parameters	**ring-id** — (Optional) Enter the ring identification number. The range is from 1 to 255.
Defaults	none
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.5.1.0	Introduced.

Usage Information

Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell Networking OS requires a command line confirmation before the command executes. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Example

```
Dell#clear frrp

Clear frrp statistics counter on all ring [confirm] yes

Dell#clear frrp 4

Clear frrp statistics counter for ring 4 [confirm] yes

Dell#
```

Related Commands

show frrp — displays the Resilient Ring Protocol configuration.

debug frrp

Clear the FRRP statistics counters.

S6000

Syntax

`debug frrp {event | packet | detail} [ring-id] [count number]`

To disable debugging, use the `no debug frrp {event | packet | detail} {ring-id} [countnumber]` command.

Parameters

event	Enter the keyword `event` to display debug information related to ring protocol transitions.
packet	Enter the keyword `packet` to display brief debug information related to control packets.

detail	Enter the keyword `detail` to display detailed debug information related to the entire ring protocol packets.
ring-id	(Optional) Enter the ring identification number. The range is from 1 to 255.
count *number*	Enter the keyword `count` then the number of debug outputs. The range is from 1 to 65534.

Defaults Disabled.

Command Modes CONFIGURATION (conf-frrp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

Usage Information Because the resilient ring protocol can potentially transmit 20 packets per interface, restrict debug information.

description

Enter an identifying description of the ring.

S6000

Syntax

`description Word`

To remove the ring description, use the `no description [Word]` command.

Parameters

Word	Enter a description of the ring. Maximum: 255 characters.

Defaults none

Command Modes CONFIGURATION (conf-frrp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

disable

Disable the resilient ring protocol.

S6000

Syntax	`disable` To enable the Resilient Ring Protocol, use the `no disable` command.
Defaults	**Disabled**
Command Modes	CONFIGURATION (conf-frrp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

interface

Configure the primary, secondary, and control-vlan interfaces.

S6000

Syntax	`interface {primary` *`interface`* `secondary` *`interface`* `control-vlan` *`vlan-id`*`}` To return to the default, use the `no interface {primary` *`interface`* `secondary` *`interface`* `control-vlan vlan-id}` command.

Parameters

primary *interface*	Enter the keyword `primary` to configure the primary interface then one of the following interfaces and slot/port information: • `Fast Ethernet interface`: enter the keyword `FastEthernet` then the slot/port information. • `Port Channel interface`: enter the keyword `port-channel` then a number. The range is from 1 to 128. • `10-Gigabit Ethernet interface`: enter the keyword `TenGigabitEthernet` then the slot/port information • `40-Gigabit Ethernet interface`: enter the keyword `fortyGigE` then the slot/port information
secondary *interface*	Enter the keyword `secondary` to configure the secondary interface then one of the following interfaces and slot/port information: • `Fast Ethernet interface`: enter the keyword `FastEthernet` then the slot/port information. • `Port Channel interface`: enter the keyword `port-channel` then a number. The range is from 1 to 128. • `10-Gigabit Ethernet interface`: enter the keyword `TenGigabitEthernet` then the slot/port information • `40-Gigabit Ethernet interface`: enter the keyword `fortyGigE` then the slot/port information
control-vlan *vlan-id*	Enter the keyword `control-vlan` then the VLAN ID. The range is from 1 to 4094.

Defaults	none
Command Modes	CONFIGURATION (conf-frrp)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

Usage Information	This command causes the Ring Manager to take ownership of the two ports after IFM validates the configuration. Ownership is relinquished for a port only when the interface does not play a part in any control VLAN, that is, the interface does not belong to any ring.
Related Commands	show frrp — displays the Resilient Ring Protocol configuration information.

member-vlan

Specify the member VLAN identification numbers.

S6000

Syntax

`member-vlan {vlan-range}`

To return to the default, use the `no member-vlan [vlan-range]` command.

Parameters

vlan-range	Enter the member VLANs using VLAN IDs (separated by commas), a range of VLAN IDs (separated by a hyphen), a single VLAN ID, or a combination. For example: VLAN IDs (comma-separated): 3, 4, 6. Range (hyphen-separated): 5-10. Combination: 3, 4, 5-10, 8.

Defaults	none
Command Modes	CONFIGURATION (conf-frrp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

mode

Set the Master or Transit mode of the ring.

S6000

Syntax

`mode {master | transit}`

To reset the mode, use the `no mode {master | transit}` command.

Parameters

master	Enter the keyword `master` to set the Ring node to Master mode.
transit	Enter the keyword`transit` to set the Ring node to Transit mode.

Defaults

Mode None

Command Modes

CONFIGURATION (conf-frrp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

protocol frrp

Enter the Resilient Ring Protocol and designate a ring identification.

S6000

Syntax `protocol frrp {ring-id}`

To exit the ring protocol, use the `no protocol frrp {ring-id}` command.

Parameters

ring-id	Enter the ring identification number. The range is from 1 to 255.

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced

Usage Information This command places you into the resilient ring protocol. After executing this command, the command line prompt changes to `conf-frrp`.

show frrp

Display the resilient ring protocol configuration.

S6000

Syntax `show frrp [ring-id [summary]] | [summary]`

Parameters

ring-id	Enter the ring identification number. The range is from 1 to 255

summary	(OPTIONAL) Enter the keyword `summary` to view just a summarized version of the Ring configuration.

Defaults none

Command Modes EXEC

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

Usage Information Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell Networking OS requires a command line confirmation before the command executes. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Usage Information Executing this command without the optional `ring-id` command clears the statistics counters on all the available rings. Dell Networking OS requires a command line confirmation before the command is executed. This command clears the following counters:

- hello Rx and Tx counters
- Topology change Rx and Tx counters
- The number of state change counters

Example (Summary)

```
Dell#show frrp summary

Ring-ID State Mode  Ctrl_Vlan Member_Vlans
----------------------------------------------
2       UP   Master   2        11-20, 25,27-30
31      UP   Transit  31       40-41
50      Down Transit  50       32
Dell#
```

Example (1)

```
Dell#show frrp 1
Ring protocol 1 is in Master mode
Ring Protocol Interface:
```

```
Primary : GigabitEthernet 0/16 State: Forwarding
Secondary: Port-channel 100 State: Blocking
Control Vlan: 1
Ring protocol Timers: Hello-Interval 50 msec Dead-Interval 150
msec
Ring Master's MAC Address is 00:01:e8:13:a3:19
Topology Change Statistics: Tx:110 Rx:45
Hello Statistics: Tx:13028 Rx:12348
Number of state Changes: 34
Member Vlans: 1000-1009
Dell#
```

Example (2 Summary)

```
Dell#show frrp 2 summary
```

```
Dell#show frrp 2 summary
Ring-ID State Mode  Ctrl_Vlan Member_Vlans
-----------------------------------------------
2       Up    Master 2        11-20, 25, 27-30
Dell#
```

Related Commands

protocol frrp — enters the resilient ring protocol and designate a ring identification.

timer

Set the hello interval or dead interval for the Ring control packets.

S6000

Syntax

`timer {hello-interval` *`milliseconds`*`}| {dead-interval` *`milliseconds`*`}`

To remove the timer, use the `no timer {hello-interval [`*`milliseconds`*`]}| {dead-interval` *`milliseconds`*`}` command.

Parameters

hello-interval *milliseconds*	Enter the keyword `hello-interval` then the time, in milliseconds, to set the hello interval of the control packets. The milliseconds must be entered in increments of 50 millisecond; for example, 50, 100, 150, and so on. If an invalid value is entered, an error message is generated. The range is from 50 to 2000 ms. Default: **500 ms**.
dead-interval *milliseconds*	Enter the keyword `dead-interval` then the time, in milliseconds, to set the dead interval of the control packets. The range is from 50 to 6000 ms. Default: **1500 ms**. NOTE: The configured dead interval must be at least three times the hello interval.

Defaults

- **500 ms** for `hello-interval` *`milliseconds`*
- **1500 ms** for `dead-interval`*`milliseconds`*

Command Modes

CONFIGURATION (conf-frrp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced.

Usage Information

The `hello interval` command is the interval at which ring frames are generated from the primary interface of the master node. The `dead interval` command is the time that elapses before a time-out occurs.

19

GARP VLAN Registration (GVRP)

The Dell Networking operating system supports the basic GVRP commands on the S6000platform.

The generic attribute registration protocol (GARP) mechanism allows the configuration of a GARP participant to propagate through a network quickly. A GARP participant registers or de-registers its attributes with other participants by making or withdrawing declarations of attributes. At the same time, based on received declarations or withdrawals, GARP handles attributes of other participants.

GVRP enables a device to propagate local VLAN registration information to other participant devices and dynamically update the VLAN registration information from other devices. The registration information updates local databases regarding active VLAN members and through which port the VLANs can be reached.

GVRP ensures that all participants on a bridged LAN maintain the same VLAN registration information. The VLAN registration information propagated by GVRP includes both manually configured local static entries and dynamic entries from other devices.

GVRP participants have the following components:

- The GVRP application
- GARP information propagation (GIP)
- GARP information declaration (GID)

Important Points to Remember

- GVRP is supported on Layer 2 ports only.
- All VLAN ports added by GVRP are tagged.
- GVRP is supported on untagged ports belonging to a default VLAN and tagged ports.
- GVRP cannot be enabled on untagged ports belonging to a non-default VLAN *unless* native VLAN is turned on.
- GVRP requires end stations with dynamic access NICs.
- Based on updates from GVRP-enabled devices, GVRP allows the system to dynamically create a port-based VLAN (unspecified) with a specific VLAN ID and a specific port.
- On a port-by-port basis, GVRP allows the system to learn about GVRP updates to an existing port-based VLAN with that VLAN ID and IEEE 802.1Q tagging.
- GVRP allows the system to send dynamic GVRP updates about your existing port-based VLAN.
- GVRP updates are not sent to any blocked spanning tree protocol (STP) ports. GVRP operates only on ports that are in the forwarding state.
- GVRP operates only on ports that are in the STP forwarding state. If you enable GVRP, a port that changes to the STP Forwarding state automatically begin to participate in GVRP. A port that changes to an STP state other than forwarding no longer participates in GVRP.

- VLANs created dynamically with GVRP exist only as long as a GVRP-enabled device is sending updates. If the devices no longer send updates, or GVRP is disabled, or the system is rebooted, all dynamic VLANs are removed.
- GVRP manages the active topology, not non-topological data such as VLAN protocols. If a local bridge must classify and analyze packets by VLAN protocols, manually configure protocol-based VLANs, and simply rely on GVRP for VLAN updates. But if the local bridge must know only how to reach a given VLAN, then GVRP provides all necessary information.
- The VLAN topologies that GVRP learns are treated differently from VLANs that are statically configured. The GVRP dynamic updates are not saved in NVRAM, while static updates are saved in NVRAM. When GVRP is disabled, the system deletes all VLAN interfaces that were learned through GVRP and leaves unchanged all VLANs that were manually configured.

clear gvrp statistics

Clear GVRP statistics on an interface.

S6000

Syntax `clear gvrp statistics interface` *`interface`*

Parameters

interface *interface*	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands	show gvrp statistics — displays the GVRP statistics.

debug gvrp

Enable debugging on GVRP.

S6000

Syntax

`debug gvrp {config | events | pdu}`

To disable debugging, use the `no debug gvrp {config | events | pdu}` command.

Parameters

config	Enter the keyword `config` to enable debugging on the GVRP configuration.
event	Enter the keyword `event` to enable debugging on the JOIN/LEAVE events.
pdu	Enter the keyword `pdu` then one of the following Interface keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults Disabled.

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

disable

Globally disable GVRP.

S6000

Syntax	`disable` To re-enable GVRP, use the `no disable` command.
Defaults	Enabled.
Command Modes	CONFIGURATION-GVRP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands	gvrp enable — enables GVRP on physical interfaces and LAGs. protocol gvrp — access GVRP protocol.

garp timers

Set the intervals (in milliseconds) for sending GARP messages.

S6000

Syntax	`garp timers {join | leave | leave-all}` To return to the previous setting, use the `no garp timers {join | leave | leave-all}` command.
Parameters	

join	Enter the keyword `join` then the number of milliseconds to configure the join time. The range is from 100 to 147483647 milliseconds. The default is **200 milliseconds**.

NOTE: Designate the milliseconds in multiples of 100.

leave	Enter the keyword `leave` then the number of milliseconds to configure the leave time. The range is from 100 to 2147483647 milliseconds. The default is **600 milliseconds**. NOTE: Designate the milliseconds in multiples of 100.
leave-all	Enter the keywords `leave-all` then the number of milliseconds to configure the leave-all time. The range is from 100 to 2147483647 milliseconds. The default is 1000 milliseconds. NOTE: Designate the milliseconds in multiples of 100.

Defaults As above.

Command Modes CONFIGURATION-GVRP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information

- Join Timer — `Join` messages announce the willingness to register some attributes with other participants. For reliability, each GARP application entity sends a `Join` message twice and uses a join timer to set the sending interval.
- Leave Timer — `Leave` announces the willingness to de-register with other participants. Together with `Join`, `Leave` messages help GARP participants complete attribute reregistration and de-registration. The leave timer starts after receipt of a leave message sent for de-registering some attribute information. If a `Join` message is *not* received before the `Leave` time expires, the GARP application entity removes the attribute information as requested.
- Leave All Timer — The `Leave All` timer starts when a GARP application entity starts. When this timer expires, the entity sends a `Leave-all` message so that other entities can reregister their attribute information. Then the `Leave-all` time begins again.

Related Commands show garp timers — displays the current GARP times.

gvrp enable

Enable GVRP on physical interfaces and LAGs.

S6000

Syntax	`gvrp enable` To disable GVRP on the interface, use the `no gvrp enable` command.
Defaults	Disabled.
Command Modes	CONFIGURATION-INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands	disable — globally disables GVRP.

gvrp registration

Configure the GVRP register type.

S6000

Syntax	`gvrp registration {fixed | normal | forbidden}` To return to the default, use the `gvrp register normal` command.
Parameters	

fixed	Enter the keyword `fixed` then the VLAN range in a comma-separated VLAN ID set.
normal	Enter the keyword `normal` then the VLAN range in a comma-separated VLAN ID set. This setting is the default.
forbidden	Enter the keyword `forbidden` then the VLAN range in a comma-separated VLAN ID set.

Defaults

normal

Command Modes

CONFIGURATION-INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information

Fixed registration prevents an interface, configured using the command line, to belong to a VLAN (static configuration) from being unconfigured when it receives a `Leave` message. Therefore, Registration mode on that interface is fixed.

Normal registration is the default registration. The port’s membership in the VLAN depends on GVRP. The interface becomes a member of a VLAN after learning about the VLAN through GVRP. If the VLAN is removed from the port that sends GVRP advertisements to this device, the port stops being a member of the VLAN.

To advertise or learn about VLANs through GVRP, use the `forbidden` command when you do not want the interface.

Related Commands

show gvrp — displays the GVRP configuration including the registration.

protocol gvrp

Access GVRP protocol — (config-gvrp)#.

S6000

Syntax

```
protocol gvrp
```

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands

disable — globally disables GVRP.

show config

Display the global GVRP configuration.

S6000

Syntax

```
show config
```

Command Modes

CONFIGURATION-GVRP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Related Commands

gvrp enable — enables GVRP on physical interfaces and LAGs.

protocol gvrp — accesses the GVRP protocol.

show garp timers

Display the GARP timer settings for sending GARP messages.

S6000

Syntax	`show garp timers`
Defaults	none
Command Modes	- EXEC - EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Example

```
Dell#show garp timers
GARP Timers      Value (milliseconds)
----------------------------------------
Join Timer         200
Leave Timer        600
LeaveAll Timer     10000
Dell#
```

Related Commands

garp timers — sets the intervals (in milliseconds) for sending GARP messages.

show gvrp

Display the GVRP configuration.

S6000

Syntax

`show gvrp [brief | interface]`

Parameters

brief	(OPTIONAL) Enter the keyword `brief` to display a brief summary of the GVRP configuration.

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information

If no ports are GVRP participants, the message output changes from `GVRP Participants running on <port_list>` to `GVRP Participants running on no ports.`

Example

```
R3#show gvrp brief
GVRP Feature is currently enabled.
Port                GVRP Status       Edge-Port
----------------------------------------------
Gi 3/0              Disabled           No
Gi 3/1              Disabled           No
Gi 3/2              Enabled            No
Gi 3/3              Disabled           No
Gi 3/4              Disabled           No
Gi 3/5              Disabled           No
Gi 3/6              Disabled           No
Gi 3/7              Disabled           No
Gi 3/8              Disabled           No
R3#show gvrp brief
```

Related Commands

show gvrp statistics — displays the GVRP statistics.

show gvrp statistics

Display the GVRP configuration statistics.

S6000

Syntax

```
show gvrp statistics {interface interface | summary}
```

Parameters

interface *interface*	(OPTIONAL) Enter the keyword `interface` then one of the interface keywords and slot/ port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
summary	Enter the keyword `summary` to display just a summary of the GVRP statistics.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on C-Series, E-Series, and S-Series

Usage Information

Invalid messages/attributes skipped can occur in the following cases:

- The incoming GVRP PDU has an incorrect length.
- "End of PDU" was reached before the complete attribute could be parsed.
- The Attribute Type of the attribute that was being parsed was not the GVRP VID Attribute Type (0x01).
- The attribute that was being parsed had an invalid attribute length.
- The attribute that was being parsed had an invalid GARP event.
- The attribute that was being parsed had an invalid VLAN ID. The valid range is from 1 to 4095.

A failed registration can occur for the following reasons:

- `Join` requests were received on a port that was blocked from learning dynamic VLANs (GVRP Blocking state).

- An entry for a new GVRP VLAN could not be created in the GVRP database.

Example

```
Dell#show gvrp statistics int gi 1/0

Join Empty Received: 0
Join In Received: 0
Empty Received: 0
LeaveIn Received: 0
Leave Empty Received: 0
Leave All Received: 40
Join Empty Transmitted: 156
Join In Transmitted: 0
Empty Transmitted: 0
Leave In Transmitted: 0
Leave Empty Transmitted: 0
Leave All Transmitted: 41
Invalid Messages/Attributes skipped: 0
Failed Registrations: 0
Dell#
```

Related Commands

show gvrp — displays the GVRP configuration.

20

ICMP Message Types

This chapter lists and describes the possible ICMP message type resulting from a ping. The first three columns list the possible symbol or type/code. For example, you would receive a ! or 03 as an echo reply from your ping.

ICMP Messages and Their Definitions.

Symbol	Type	Code	Description	Query	Error
.			Timeout (no reply)		
!	0	3	echo reply	.	
U	3		destination unreachable:		
		0	network unreachable		.
		1	host unreachable		.
		2	protocol unreachable		.
		3	port unreachable		.
		4	fragmentation needed but don’t fragment bit set		.
		5	source route failed		.
		6	destination network unknown		.
		7	destination host unknown		.
		8	source host isolated (obsolete)		.
		9	destination network administratively prohibited		.
		10	destination host administratively prohibited		.
		11	network unreachable for TOS		.
		12	host unreachable for TOS		.
		13	communication administratively prohibited by filtering		.
		14	host precedence violation		.
		15	precedence cutoff in effect		.
C	4	0	source quench		.
	5		redirect		.

Symbol	Type	Code	Description	Query	Error
		0	redirect for network		.
		1	redirect for host		.
		2	redirect for type-of-service and network		.
		3	redirect for type-of-service and host		.
	8	0	echo request	.	
	9	0	router advertisement	.	
	10	0	router solicitation	.	
&	11		time exceeded:		
		0	time-to-live equals 0 during transit		.
		1	time-to-live equals 0 during reassembly		.
	12		parameter problem:		
		1	IP header bad (catchall error)		.
		2	required option missing		.
	13	0	timestamp request	.	
	14	0	timestamp reply	.	
	15	0	information request (obsolete)	.	
	16	0	information reply (obsolete)	.	
	17	0	address mask request	.	
	18	0	address mask reply	.	

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Internet Group Management Protocol (IGMP)

The IGMP commands are supported by the Dell Networking operating software on the S6000 platform.

This chapter contains the following sections:

- IGMP Commands
- IGMP Snooping Commands

IGMP Commands

Dell Networking OS supports IGMPv1/v2/v3 and is compliant with RFC-3376.

Important Points to Remember

- Dell Networking OS supports protocol-independent multicast-sparse (PIM-SM) and protocol-independent source-specific multicast (PIM-SSM) include and exclude modes.
- IGMPv2 is the default version of IGMP on interfaces. You can configure IGMPv3 on interfaces. It is backward compatible with IGMPv2.
- On the S6000, the maximum number of interfaces supported 31.
- There is no hard limit on the maximum number of groups supported.
- IGMPv3 router interoperability with IGMPv2 and IGMPv1 routers on the same subnet is not supported.
- An administrative command (`ip igmp version`) is added to manually set the IGMP version.
- All commands previously used for IGMPv2 are compatible with IGMPv3.

clear ip igmp groups

Clear entries from the group cache table.

S6000

Syntax

```
clear ip igmp groups [group-address | interface]
```

Parameters

group-address	(OPTIONAL) Enter the IP multicast group address in dotted decimal format.
interface *interface*	Enter the following keywords and slot/port or number information: • For a Port-Channel interface, enter the keyword `port-channel` then the slot/port information. The range is from 1 to 128.

- For a VLAN interface, enter the keyword `vlan` then the slot/port information. The range is from 1 to 4094.
- For a 1-Gigabit Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information.
- For a 10-Gigabit Ethernet interface, enter the keyword `tengigabitethernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

IGMP commands accept *only* non-VLAN interfaces — specifying VLAN does not yield results.

debug ip igmp

Enable debugging of IGMP packets.

S6000

Syntax

```
debug ip igmp [group address | interface]
```

- To disable IGMP debugging, use the `no debug ip igmp [group address | interface]` command.
- To disable all debugging, use the `undebug all` command.

Parameters

group-address	(OPTIONAL) Enter the IP multicast group address in dotted decimal format.

interface *interface*	Enter the following keywords and slot/port or number information: • For a 1-Gigabit Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a Port Channel interface, enter the keyword `port-channel` then a number. The range is from 1 to 128. • For a 10–Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults Disabled.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information IGMP commands accept *only* non-VLAN interfaces — specifying VLAN does not yield results. This command displays packets for IGMP and IGMP snooping.

ip igmp access-group

To specify access control for packets, use this feature.

S6000

Syntax `ip igmp access-group` *`access-list`*

To remove the feature, use the `no ip igmp access-group access-list` command.

Parameters

access-list	Enter the name of the extended ACL (16 characters maximum). Enter the name of the extended ACL (139 characters maximum).

Defaults: Not configured

Command Modes: INTERFACE (conf-if-*interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.
Version 7.6.1.0	Introduced on E-Series.

Usage Information

The access list accepted is an extended ACL. To block IGMP reports from hosts, on a per-interface basis based on the group address and source address that you specify in the access list, use this feature.

ip igmp group-join-limit

To limit the number of IGMP groups that can be joined in a second, use this feature.

S6000

Syntax

```
ip igmp group-join-limit number
```

Parameters

number	Enter the number of IGMP groups permitted to join in a second. The range is from 1 to 10000.

Defaults: none

Command Modes: CONFIGURATION (conf-if-*interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.
Version 7.6.1.0	Introduced on the E-Series.

ip igmp immediate-leave

Enable IGMP immediate leave.

S6000

Syntax

```
ip igmp immediate-leave [group-list prefix-list-name]
```

To disable `ip igmp immediate leave`, use the `no ip igmp immediate-leave` command.

Parameters

group-list *prefix-list-name*	Enter the keywords `group-list` then a string up to 16 characters long of the prefix-list-name.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information	Querier normally sends some group-specific queries when a `leave` message is received for a group prior to deleting a group from the membership database. There may be situations when you require immediate deletion of a group from the membership database. This command provides a way to achieve the immediate deletion. In addition, this command provides a way to enable `immediate-leave processing` for specified groups.

ip igmp last-member-query-interval

Change the last member query interval, which is the Max Response Time inserted into Group-Specific Queries sent in response to Leave Group messages. This interval is also the interval between Group-Specific Query messages.

S6000

Syntax

`ip igmp last-member-query-interval` *`milliseconds`*

To return to the default value, use the `no ip igmp last-member-query-interval` command.

Parameters

milliseconds	Enter the number of milliseconds as the interval. The range is from 100 to 65535. The default is **1000 milliseconds**.

Defaults

1000 milliseconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
E-Series legacy command	

ip igmp querier-timeout

Change the interval that must pass before a multicast router decides that there is no longer another multicast router that should be the querier.

Syntax	`ip igmp querier-timeout` *`seconds`* To return to the default value, use the `no ip igmp querier-timeout` command.
Parameters	*seconds* — Enter the number of seconds the router must wait to become the new querier. The range is from 60 to 300. The default is **125 seconds**.
Defaults	**125 seconds**
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
Version 7.5.1.0	Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
E-Series legacy command.	

ip igmp query-interval

Change the transmission frequency of IGMP general queries the Querier sends.

S6000

Syntax

```
ip igmp query-interval seconds
```

To return to the default values, use the `no ip igmp query-interval` command.

Parameters

seconds	Enter the number of seconds between queries sent out. The range is from 1 to 18000. The default is **60 seconds**.

Defaults **60 seconds**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
Version 7.5.1.0	Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
E-Series legacy command.	

ip igmp query-max-resp-time

Set the maximum query response time advertised in general queries.

S6000

Syntax	`ip igmp query-max-resp-time seconds` To return to the default values, use the `no ip igmp query-max-resp-time` command.
Parameters	*seconds* — Enter the number of seconds for the maximum response time. The range is from 1 to 25. The default is **10 seconds**.
Defaults	**10 seconds**
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced on the S-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
Version 7.5.1.0	Introduced on the C-Series in Interface VLAN mode only to enable the system to act as an IGMP Proxy Querier.
E-Series legacy command.	

ip igmp ssm-map

To translate (*,G) memberships to (S,G) memberships, use a statically configured list.

S6000

Syntax

`ip igmp ssm-map` *`std-access-list source-address`*

Undo this configuration, that is, remove SSM map (S,G) states and replace them with (*,G) state, use the `ip igmp ssm-map` *`std-access-list source-address`* command.

Parameters

std-access-list	Specify the standard IP access list that contains the mapping rules for multicast groups.
source-address	Specify the multicast source address to which the groups are mapped.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.
Version 7.7.1.0	Introduced on the E-Series.

Usage Information

Mapping applies to both v1 and v2 IGMP joins; any updates to the ACL are reflected in the IGMP groups. You may not use extended access lists with this command. When you configure a static SSM map and the router cannot find any matching access lists, the router continues to accept (*,G) groups.

Related Commands

ip access-list standard — creates a standard access list to filter based on IP address.

ip igmp static-group

Configure an IGMP static group.

S6000

Syntax

`ip igmp static-group {`*`group address`*` [exclude [`*`source address`*`]] | [include {`*`source address`*`}]}`

To delete a static address, use the `no ip igmp static-group {`*`group address`*` [exclude [`*`source address`*`]] | [include {source address}]}` command.

Parameters

group address	Enter the group address in dotted decimal format (A.B.C.D).
exclude *source address*	(OPTIONAL) Enter the keyword `exclude` then the source address, in dotted decimal format (A.B.C.D), for which a static entry is added.
include *source address*	(OPTIONAL) Enter the keyword `include` then the source address, in dotted decimal format (A.B.C.D), for which a static entry is added.

Defaults none

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.5.1.0	Expanded to support the `exclude` and `include` options.
E-Series legacy command	

Usage Information

A group in `include` mode must have at least one source address defined. In `exclude` mode, if you do not specify a source address, Dell Networking OS implicitly assumes all sources are included. If you do not specify either `include` or `exclude`, Dell Networking OS implicitly assumes a IGMPv2 static join.

Command Limitations

- Only one mode (`include` or `exclude`) is permitted per multicast group per interface. To configure another mode, all sources belonging to the original mode must be unconfigured.
- If a static configuration is present and a packet for the same group arrives on an interface, the dynamic entry completely overwrites all the static configuration for the group.

Related Commands

show ip igmp groups — displays IGMP group information.

ip igmp version

Manually set the version of the router to IGMPv2 or IGMPv3.

S6000

Syntax

```
ip igmp version {2 | 3}
```

Parameters

2	Enter the number 2 to set the IGMP version number to IGMPv2.
3	Enter the number 3 to set the IGMP version number to IGMPv3.

Defaults

2 (that is, IGMPv2)

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.

Version 7.5.1.0	Introduced on the E-Series.

show ip igmp groups

View the IGMP groups.

S6000

Syntax

```
show ip igmp groups [group-address [detail] | detail |
interface [group-address [detail]]]
```

Parameters

group-address	(OPTIONAL) Enter the group address in dotted decimal format to view information on that group only.
interface	(OPTIONAL) Enter the interface type and slot/port information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a 100/1000 Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 1-Gigabit Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `tengigabitethernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface enter the keyword `vlan` then a number from 1 to 4094.
detail	(OPTIONAL) Enter the keyword `detail` to display the IGMPv3 source information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series and C-Series.
Version 7.5.1.0	Expanded to support the `detail` option.
E-Series legacy command.	

Usage Information

This command displays the IGMP database, including configured entries for either all groups on all interfaces, all groups on specific interfaces, or specific groups on specific interfaces.

The following describes the `show ip igmp groups` command shown in the following example.

Field	Description
Group Address	Lists the multicast address for the IGMP group.
Interface	Lists the interface type, slot and port number.
Mode	Displays the IGMP version used.
Uptime	Displays the amount of time the group has been operational.
Expires	Displays the amount of time until the entry expires.
Last Reporter	Displays the IP address of the last host to be a member of the IGMP group.
Member Ports	Indicates the port channel. If the port channel is VLT, an asterisk (*) after the port channel number indicates the port channel is locally down and that a remote VLT port is up.

Example

```
Dell#show ip igmp groups
Total Number of Groups: 5
IGMP Connected Group Membership
Group Address Interface Mode Uptime Expires Last Reporter
225.0.0.0    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2
225.0.0.1    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2
225.0.0.2    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2
225.0.0.3    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2
225.0.0.4    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2
```

Example (VLT)

NOTE: The asterisk (*) after the port channel number (Po 2) highlighted in the following example indicates the port channel is VLT, that the local VLT port channel is down and the remote VLT port is up.

```
Dell#show ip igmp groups
Total Number of Groups: 5
IGMP Connected Group Membership
```

```
Group Address Interface Mode Uptime Expires Last Reporter
225.0.0.0    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2*
225.0.0.1    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2*
225.0.0.2    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2*
225.0.0.3    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2*
225.0.0.4    Vlan 100 IGMPv2 00:00:05 00:02:04 3.0.0.51
Member Ports: Po 2*
```

show ip igmp interface

View information on the interfaces participating in IGMP.

S6000

Syntax

`show ip igmp interface [interface]`

Parameters

interface	(OPTIONAL) Enter the interface type and slot/port information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a 100/1000 Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 1-Gigabit Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `tengigabitethernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information

IGMP commands accept *only* non-VLAN interfaces — specifying VLAN does not yield results.

Example

```
Dell#show ip igmp interface
GigabitEthernet 0/0 is down, line protocol is down
  Internet protocol processing disabled
GigabitEthernet 0/5 is down, line protocol is down
  Internet protocol processing disabled
GigabitEthernet 0/6 is down, line protocol is down
  Internet protocol processing disabled
GigabitEthernet 0/7 is up, line protocol is down
  Internet protocol processing disabled
GigabitEthernet 7/9 is up, line protocol is up
  Internet address is 10.87.5.250/24
  IGMP is enabled on interface
  IGMP query interval is 60 seconds
  IGMP querier timeout is 120 seconds
  IGMP max query response time is 10 seconds
  IGMP last member query response interval is 1000 ms
  IGMP activity: 0 joins, 0 leaves
  IGMP querying router is 10.87.5.250 (this system)
  IGMP version is 2
```

show ip igmp ssm-map

Display is a list of groups that are currently in the IGMP group table and contain SSM mapped sources.

S6000

Syntax

`show ip igmp ssm-map [group]`

Parameters

group	(OPTIONAL) Enter the multicast group address in the form A.B.C.D to display the list of sources to which this group is mapped.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.
Version 7.7.1.0	Introduced on the E-Series.

Related Commands ip igmp ssm-map — uses a statically configured list to translate (*,G) memberships to (S,G) memberships.

IGMP Snooping Commands

Dell Networking OS supports IGMP Snooping version 2 and 3 on all Dell Networking systems.

Important Points to Remember for IGMP Snooping

- Dell Networking OS supports version 1, version 2, and version 3 hosts.
- Dell Networking OS IGMP snooping implementation is based on IP multicast address (not based on Layer 2 multicast mac address) and the IGMP snooping entries are in Layer 3 flow table not in Layer 2 forwarding information base (FIB).
- Dell Networking OS IGMP snooping implementation is based on draft-ietf-magma-snoop-10.
- Dell Networking OS supports IGMP snooping on JUMBO-enabled cards.
- IGMP snooping is not enabled by default on the switch.
- A maximum of 1800 groups and 600 VLAN are supported.
- IGMP snooping is not supported on a default VLAN interface.
- IGMP snooping is not supported over VLAN-Stack-enabled VLAN interfaces (you must disable IGMP snooping on a VLAN interface before configuring VLAN-Stack-related commands).
- IGMP snooping does not react to Layer 2 topology changes triggered by spanning tree protocol (STP).
- IGMP snooping reacts to Layer 2 topology changes multiple spanning tree protocol (MSTP) triggers by sending a general query on the interface that comes in the FWD state.

Important Points to Remember for IGMP Querier

- The IGMP snooping Querier supports version 2.
- You must configure an IP address to the VLAN interface for IGMP snooping Querier to begin. The IGMP snooping Querier disables itself when a VLAN IP address is cleared, and then it restarts itself when an IP address is reassigned to the VLAN interface.
- When enabled, IGMP snooping Querier does not start if there is a statically configured multicast router interface in the VLAN.
- When enabled, IGMP snooping Querier starts after one query interval in case no IGMP general query (with IP SA lower than its VLAN IP address) is received on any of its VLAN members.
- When enabled, IGMP snooping Querier periodically sends general queries with an IP source address of the VLAN interface. If it receives a general query on any of its VLAN member, it checks the IP source address of the incoming frame.

If the IP SA in the incoming IGMP general query frame is lower than the IP address of the VLAN interface, the switch disables its IGMP snooping Querier functionality.

If the IP SA of the incoming IGMP general query is higher than the VLAN IP address, the switch continues to work as an IGMP snooping Querier.

ip igmp snooping enable

Enable IGMP snooping on all or a single VLAN. This command is the master on/off switch to enable IGMP snooping.

Syntax

```
ip igmp snooping enable
```

To disable IGMP snooping, use the `no ip igmp snooping enable` command.

Defaults

Disabled.

Command Modes

- CONFIGURATION
- INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Usage Information

To enable IGMP snooping, enter this command. When you enable this command from CONFIGURATION mode, IGMP snooping enables on all VLAN interfaces (except the default VLAN).

NOTE: Execute the `no shutdown` command on the VLAN interface for IGMP Snooping to function.

ip igmp snooping fast-leave

Enable IGMP snooping fast-leave for this VLAN.

S6000

Syntax	`ip igmp snooping fast-leave` To disable IGMP snooping fast leave, use the `no igmp snooping fast-leave` command.
Defaults	Not configured.
Command Modes	INTERFACE VLAN — (conf-if-vl-*n*)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information	Queriers normally send some queries when a leave message is received prior to deleting a group from the membership database. There may be situations when you require a fast deletion of a group. When you enable IGMP fast leave processing, the switch removes an interface from the multicast group as soon as it detects an IGMP version 2 leave message on the interface.

ip igmp snooping flood

This command controls the flooding behavior of unregistered multicast data packets.

S6000

Syntax	`ip igmp snooping flood`
Defaults	Enabled.

Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Seris and S-Series.
Version 7.7.1.0	Introduced on the E-Series.
E-Series legacy command	

Usage Information	On the C-Series and S-Series, unregistered multicast data traffic drops when you disable flooding; they do not forward the packets to multicast router ports. On the C-Series and S-Series, in order to disable Layer 2 multicast flooding, disable Layer 3 multicast (`no ip multicast-routing`).

ip igmp snooping last-member-query-interval

The last member query interval is the maximum response time inserted into Group-Specific queries sent in response to Group-Leave messages.

S6000

Syntax	`ip igmp snooping last-member-query-interval` *`milliseconds`* To return to the default value, use the `no ip igmp snooping last-member-query-interval` command.
Parameters	

milliseconds	Enter the interval in milliseconds. The range is from 100 to 65535. The default is **1000 milliseconds**.

Defaults	**1000 milliseconds**
Command Modes	INTERFACE VLAN
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

This last-member-query-interval is also the interval between successive Group-Specific Query messages. To change the last-member-query interval, use this command.

ip igmp snooping mrouter

Statically configure a VLAN member port as a multicast router interface.

S6000

Syntax

`ip igmp snooping mrouter interface interface`

To delete a specific multicast router interface, use the `no igmp snooping mrouter interface interface` command.

Parameters

interface *interface*	Enter the following keywords and slot/port or number information: • For a 100/1000 Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 1-Gigabit Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128.

Defaults

Not configured.

Command Modes	INTERFACE VLAN — (conf-if-vl-*n*)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information	Dell Networking OS provides the capability of statically configuring the interface to which a multicast router is attached. To configure a static connection to the multicast router, enter the `ip igmp snooping mrouter interface` command in the VLAN context. The interface to the router must be a part of the VLAN where you are entering the command.

ip igmp snooping querier

Enable IGMP querier processing for the VLAN interface.

S6000

Syntax	`ip igmp snooping querier` To disable IGMP querier processing for the VLAN interface, use the `no ip igmp snooping querier` command.
Defaults	Not configured.
Command Modes	INTERFACE VLAN — (conf-if-vl-*n*)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

This command enables the IGMP switch to send General Queries periodically. This behavior is useful when there is no multicast router present in the VLAN because the multicast traffic is not routed. Assign an IP address to the VLAN interface for the switch to act as a querier for this VLAN.

show ip igmp snooping mrouter

Display multicast router interfaces.

S6000

Syntax

```
show ip igmp snooping mrouter [vlan number]
```

Parameters

vlan *number*	Enter the keyword `vlan` then the vlan number. The range is from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command.	

Usage Information

If the port channel is a VLT port channel, an asterisk (*) after the port channel number (Po 100*) indicates the port channel is locally down and that a remote VLT port is up.

Example

```
Dell#show ip igmp snooping mrouter
Interface Router Ports
Vlan 2 Gi 13/3, Po 1
Dell#
```

Related Commands

- ip igmp snooping mrouter — configures a static connection to the multicast router.
- show ip igmp groups — view groups.

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Interfaces

The commands in this chapter are supported by Dell Networking operating software on the S6000 platform.

This chapter contains the following sections:

- Basic Interface Commands
- Port Channel Commands

This chapter contains the following sections:

- Basic Interface Commands
- Port Channel Commands
- Time Domain Reflectometer (TDR)
- UDP Broadcast

Basic Interface Commands

The following commands are for Physical, Loopback, and Null interfaces.

clear counters

Clear the counters used in the show interfaces commands for all virtual router redundancy protocol (VRRP) groups, virtual local area networks (VLANs), and physical interfaces, or selected ones.

S6000

Syntax

```
clear counters [interface] [vrrp [ipv6 {vrid} | learning-limit]
```

Parameters

interface (OPTIONAL) Enter any of the following keywords and slot/port or number to clear counters from a specified interface:

- For IPv4 access-group counters, enter the keyword `ip`.
- For IPv6 access-group counters, enter the keyword `ipv6`.
- For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.
- For MAC access-group counters, enter the keyword `mac`.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For the management interface on the RPM, enter the keyword `ManagementEthernet` then slot/port information. The slot range is from 0 to 1 and the port range is 0.

- For a 10-Gigabit Ethernet interface, enter the keyword `tenGigE` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a tunnel interface, enter the keyword `tunnel`. The range is from 1 to 16383.

vrrp [[ipv6] *vrid*]	(OPTIONAL) Enter the keyword `vrrp` to clear the counters of all VRRP groups. To clear the counters of VRRP groups on all IPv6 interfaces, enter `ipv6`. To clear the counters of a specified group, enter a VRID number from 1 to 255.
learning-limit	(OPTIONAL) Enter the keywords `learning-limit` to clear unknown source address (SA) drop counters when MAC learning limit is configured on the interface.

Defaults Without an interface specified, the command clears all interface counters.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.4.1.0	Added support (E-Series only) for VRRP groups in a VRF instance.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4093 VLANs on the E-Series ExaScale. Prior to the release, 2094 was supported.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Updated the definition of the `learning-limit` option for clarity.

Example

```
Dell#clear counters
Clear counters on all interfaces [confirm]
```

Related Commands

mac learning-limit — allows aging of MACs even though a learning-limit is configured or disallow station move on learned MACs.

show interfaces — displays information on the interfaces.

clear dampening

Clear the dampening counters on all the interfaces or just the specified interface.

S6000

Syntax

```
clear dampening [interface]
```

Parameters

interface	(OPTIONAL) Enter any of the following keywords and slot/port or number to clear counters from a specified interface: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

Without an interface specified, the command clears all interface dampening counters.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Example

```
Dell#clear dampening tegigabitethernet 1/2
Clear dampening counters on TeGi 1/2 [confirm] y
Dell#
```

Related Commands

show interfaces dampening — displays interface dampening information.

dampening — configures dampening on an interface.

dampening

Configure dampening on an interface.

S6000

Syntax

```
dampening [[[[half-life] [reuse-threshold]] [suppress-threshold]] [max-suppress-time]]
```

Parameters

half-life	Enter the number of seconds after which the penalty is decreased. The penalty decreases half after the half-life period expires. The range is from 1 to 30 seconds. The default is **5 seconds**.
reuse-threshold	Enter a number as the reuse threshold, the penalty value below which the interface state is changed to “up”. The range is from 1 to 20000. The default is **750**.
suppress-threshold	Enter a number as the suppress threshold, the penalty value above which the interface state is changed to “error disabled”. The range is from 1 to 20000. The default is **2500**.
max-suppress-time	Enter the maximum number for which a route can be suppressed. The default is four times the half-life value. The range is from 1 to 86400. The default is **20 seconds**.

Defaults

Disabled.

Command Modes

INTERFACE (conf-if-)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

With each flap, Dell Networking OS penalizes the interface by assigning a penalty (1024) that decays exponentially depending on the configured half-life. After the accumulated penalty exceeds the suppress threshold value, the interface moves to the Error-Disabled state. This interface state is deemed as “down” by all static/dynamic Layer 2 and Layer 3 protocols. The penalty is exponentially decayed based on the half-life timer. After the penalty decays below the reuse threshold, the interface enables. The configured parameters are as follows:

- `suppress-threshold` should be greater than `reuse-threshold`
- `max-suppress-time` should be at least 4 times `half-life`

NOTE: You cannot apply dampening on an interface that is monitoring traffic for other interfaces.

Example

```
Dell(conf-if-gi-3/2)#dampening 20 800 4500 120
Dell(conf-if-gi-3/2)#
```

Related Commands

clear dampening — clears the dampening counters on all the interfaces or just the specified interface.

show interfaces dampening — displays interface dampening information.

description

Assign a descriptive text string to the interface.

S6000

Syntax

`description desc_text`

To delete a description, use the `no description` command.

Parameters

desc_text	Enter a text string up to 240 characters long.

Defaults

none

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Modified for E-Series: Revised from 78 to 240 characters.

Usage Information

Important Points to Remember:

- To use special characters as a part of the description string, you must enclose the whole string in double quotes.
- Spaces between characters are not preserved after entering this command unless you enclose the entire description in quotation marks ("*`desc_text`*").
- Entering a text string after the `description` command overwrites any previous text string that you previously configured as the description.
- The `shutdown` and `description` commands are the only commands that you can configure on an interface that is a member of a port-channel.
- Use the `show interfaces description` command to display descriptions configured for each interface.

duplex (10/100 Interfaces)

Configure duplex mode on any physical interfaces where the speed is set to 10/100.

S6000

Syntax

`duplex {half | full}`

To return to the default setting, use the `no duplex` command.

Parameters

half	Enter the keyword `half` to set the physical interface to transmit only in one direction.
full	Enter the keyword `full` to set the physical interface to transmit in both directions.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Introduced

Usage Information

This command applies to any physical interface with speed set to 10/100.

NOTE: Starting with Dell Networking OS version 7.8.1.0, when you use a copper SFP2 module with catalog number GP-SFP2-1T in the S25P model of the S-Series, you can manually set its speed with the `speed` command. When you set the speed to 10 Mbps or 100 Mbps, you can also execute the `duplex` command.

Related Commands

negotiation auto — enables or disables auto-negotiation on an interface.

flowcontrol

Control how the system responds to and generates 802.3x pause frames on 10 Gig and 40 Gig ports.

S6000

Syntax

```
flowcontrol rx {off | on} tx {off | on}
```

```
flowcontrol rx {off | on} tx {off | on} [pause- threshold
{<1-12480>] [resume-offset <1-12480>}
```

The threshold commands are supported on S-Series only.

To return to the default, use the no flowcontrol rx {off | on}tx {off | on} threshold command.

Parameters

rx on	Enter the keywords `rx on` to process the received flow control frames on this port. This is the default value for the receive side.
rx off	Enter the keywords `rx off` to ignore the received flow control frames on this port.
tx on	Enter the keywords `tx on` to send control frames from this port to the connected device when a higher rate of traffic is received.

tx off	Enter the keywords `tx off` so that flow control frames are not sent from this port to the connected device when a higher rate of traffic is received.

Parameters

rx on	Enter the keywords `rx on` to process the received flow control frames on this port.
rx off	Enter the keywords `rx off` to ignore the received flow control frames on this port.
tx on	Enter the keywords `tx on` to send control frames from this port to the connected device when a higher rate of traffic is received.
tx off	Enter the keywords `tx off` so that flow control frames are not sent from this port to the connected device when a higher rate of traffic is received.
pause-threshold	Enter the buffer threshold limit for generating `PAUSE` frames.
resume-offset	Enter the offset value for generating `PAUSE` frames to resume traffic.

Defaults

rx off tx off

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Versions 6.5.1.9 and 7.4.1.0	Introduced on the E-Series.
Version 7.8.1.0	Introduced on the C-Series and S-Series with the `thresholds` option.

Usage Information

The globally assigned 48-bit Multicast address 01-80-C2-00-00-01 is used to send and receive pause frames. To allow full-duplex flow control, stations implementing the pause operation instruct the MAC to enable the reception of frames with a destination address equal to this multicast address.

When a port receives traffic at a higher rate than it can process, the frames are stored in the port buffer. As a result, buffer usage increases. When the buffer usage reaches the value specified in the “pause-threshold” argument, the port sends PAUSE frame to the connected link partner to stop sending the traffic. Eventually this reduces the buffer usage. When the buffer usage drops by the value specified in the “resume-threshold”, the port again sends a PAUSE frame with 0 as wait-time. This results in resume of the paused traffic flow.

Important Points to Remember

- Do not enable `tx pause` when buffer carving is enabled. For information and assistance, consult Dell Networking TAC.
- The only configuration applicable to half duplex ports is `rx off tx off`. The following error is returned:

  ```
  Can’t configure flowcontrol when half duplex is configure,
  config ignored
  ```

- Half duplex cannot be configured when the flow control configuration is on (default is `rx on tx on`). The following error is returned:

  ```
  Can’t configure half duplex when flowcontrol is on, config
  ignored
  ```

NOTE: The flow control must be off (`rx off tx off`) before configuring the half duplex.

- Speeds less than 1 Gig cannot be configured when the asymmetric flow control configuration is on. The following error is returned:

  ```
  Can’t configure speed <1G when Asymmetric flowcontrol is on,
  config ignored
  ```

- Dell Networking OS only supports `rx on tx on` and `rx off tx off` for speeds less than 1 Gig (Symmetric).

NOTE: If you use the `disable rx flow control` command, Dell Networking recommends rebooting the system.

Example

```
Dell(conf-if-Tegi-0/1)#show config
!
interface GigabitEthernet 0/1
no ip address
switchport
no negotiation auto
flowcontrol rx off tx on
no shutdown
...
```

Example (Values)

This Example shows how Dell Networking OS negotiates the flow control values between two Dell Networking chassis connected back-to-back using 1G copper ports.

```
Configured

LocRxConf LocTxConf RemoteRxConf RemoteTxConf
off       off         off           off
                      off           on
                      on            off
```

```
                     on            on

off       on         off           off
                     off           on
                     on            off
                     on            on

on        off        off           off
                     off           on
                     on            off
                     on            on

on        on         off           off
                     off           on
                     on            off
                     on            on

LocNegRx LocNegTx RemNegRx RemNegTx
off      off     off      off
off      off     off      off
off      off     off      off
off      off     off      off

off      off     off      off
off      off     off      off
off      on      on       off
off      off     off      off

off      off     off      off
on       off     off      on
on       on      on       on
on       on      on       on

off      off       off    off
off      off       off    off
on       on        on     on
on       on        on     on
```

Related Commands	show running-config — displays the flow configuration parameters (non-default values only). show interfaces — displays the negotiated flow control parameters.

interface

Configure a physical interface on the switch.

S6000

Syntax	`interface` *`interface range`*

Parameters

interface	Enter one of the following keywords and slot/port or number information: • For a null interface, enter the keyword `null` then the slot/port information. The Null interface number is 0. • For a Management Ethernet interface, enter the keyword `managementethernet` then the slot/port information.

- For a Loopback interface, enter the keyword `loopback` then the slot/port information. The range is from 0 to 16383.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a Tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383.
- For a VLAN interface, enter the keyword `vlan` then the slot/port information. The range is from 1 to 4094.

range	(Optional) Enter the keyword `range` to configure an interface range.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added the support for interfaces.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Introduced

Usage Information

You cannot delete a physical interface.

By default, physical interfaces are disabled (`shutdown`) and are not assigned to an IP address or switchport. To place an interface in Layer 2 mode, ensure that the interface's configuration does not contain an IP address and enter the `switchport` command.

You can create up to 64 tunnel interfaces. The tunnel is added as a logical interface with no default configuration. To delete a tunnel interface, use the `no interface tunnel` *`tunnel-id`* command.

The tunnel interface operates as an ECMP (equal cost multi path) only when the next hop to the tunnel destination is over a physical interface. If you select any other interface as the next hop to the tunnel destination, the tunnel interface does not operate as an ECMP.

Example

```
Dell(conf)#int tengigabitethernet 0/0
Dell(conf-if-te-0/0)#exit
Dell(conf)#
```

Related Commands

interface loopback — configures a Loopback interface.

interface null — configures a Null interface.

interface port-channel — configures a port channel.

interface vlan — configures a VLAN.

show interfaces — displays the interface configuration.

interface group

Create or delete group of VLANs with a single command. You can also use this command to apply a set of configurations on a group of interfaces.

S6000

Syntax

`interface group [fortyGigE slot/port { - port }| gigabitethernet slot/port { - port }| tengigabitethernet slot/port { - port } | vlan vlanid {- vlanid } ]`

To delete a range of VLANs, use the following command: `no interface group vlan vlanid {- vlanid}`

Parameters

interface, interface,...	Enter the keywords `interface group` and one of the interfaces — slot/port or VLAN number. Select the range of interfaces for bulk configuration. Spaces are not required between the commas. Comma-separated ranges can include VLANs and physical interfaces. Enter the member VLANs using VLAN IDs (separated by commas), a range of VLAN IDs (separated by a hyphen), a single VLAN ID, or a combination. For example: VLAN IDs (comma-separated): 3, 4, 6. Range (hyphen-separated): 5-10. Slot/Port information need not contain a space before and after the dash. For example. both of the following commands are valid: `interface group`

`gigabitethernet 0/1 - 5 ;interface group gigabitethernet 0/1-5`.

- For a Gigabit Ethernet interface, enter the keyword `gigabitethernet` then the slot/port information.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

CONFIGURATION

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.

Usage Information

The `interface group` command will create all the non-existent VLANs specified in the range. On successful command execution, the CLI switches to the interface group context.

The configuration commands inside the group context will be the similar to that of the existing range command.

Note: For release 9.4(0.0), the group command is supported only for VLANs and physical interfaces.

Example

```
Dell(conf)#interface group ?
fortyGigE               FortyGigabit Ethernet interface
gigabitethernet         GigabitEthernet interface IEEE 802.3z
tengigabitethernet      TenGigabit Ethernet interface
vlan                    VLAN keyword

Dell(conf)# interface group vlan 1 - 2 , tengigabitethernet
0/0
Dell(conf-if-group-vl-1-2,te-0/0)# no shutdown
Dell(conf-if-group-vl-1-2,te-0/0)# end
```

interface loopback

Configure a Loopback interface.

S6000

Syntax

`interface loopback` *`number`*

To remove a loopback interface, use the `no interface loopback` *`number`* command.

Parameters

number	Enter a number as the interface number. The range is from 0 to 16383.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Introduced

Example

```
Dell(conf)#interface loopback 1655
Dell(conf-if-lo-1655)#
```

Related Commands

interface — configures a physical interface.

interface null — configures a Null interface.

interface port-channel — configures a port channel.

interface vlan — configures a VLAN.

interface ManagementEthernet

Configure the Management port on the system (either the Primary or Standby RPM).

S6000

Syntax `interface ManagementEthernet slot/port`

Parameters

slot/port	Enter the keyword `ManagementEthernet`, then the slot number (0 or 1) and port number zero (0).

Defaults Not configured.

Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.11.1	Introduced on the S55, S60, and S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Introduced

Usage Information

You cannot delete a Management port.

The Management port is enabled by default (`no shutdown`). To assign an IP address to the Management port, use the `ip address` command.

If your system has two RPMs installed, use the `show redundancy` command to display which RPM is the Primary RPM.

Example

```
Dell(conf)#interface managementethernet 0/0
Dell(conf-if-ma-0/0)#
```

Related Commands

management route — configures a static route that points to the Management interface or a forwarding router.

speed (Management interface) — clears the FIB entries on a specified line card.

interface null

Configure a Null interface on the switch.

S6000

Syntax

`interface null` *`number`*

Parameters

number	Enter zero (0) as the Null interface number.

Defaults

Not configured; number = **0**

Command Modes
CONFIGURATION

Command History
This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Introduced

Usage Information
You cannot delete the Null interface. The only configuration command possible in a Null interface is `ip unreachables`.

Example

```
Dell(conf)#interface null 0
Dell(conf-if-nu-0)#
```

Related Commands
interface — configures a physical interface.

interface loopback — configures a Loopback interface.

interface port-channel — configures a port channel.

interface vlan — configures a VLAN.

ip unreachables — enables generation of internet control message protocol (ICMP) unreachable messages.

interface range

This command permits configuration of a range of interfaces to which subsequent commands are applied (bulk configuration). Using the `interface range` command, you can enter identical commands for a range of interface.

S6000

Syntax
`interface range interface, interface,...`

Parameters

interface, interface,...	Enter the keywords `interface range` and one of the interfaces — slot/port, port-channel, or VLAN number. Select

the range of interfaces for bulk configuration. You can enter up to six comma-separated ranges. Spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels, and physical interfaces.

Slot/Port information must contain a space before and after the dash. For example, `interface range gigabitethernet 0/1 - 5` is valid; `interface range gigabitethernet 0/1-5` is NOT valid.

- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
- For a Tunnel interface, enter the keyword `Tunnel` then a number from 1 to 16383.

Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.2.1.0	Added support for 4093 VLANs on E-Series ExaScale. Prior releases supported 2094.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When creating an interface range, interfaces appear in the order they are entered; they are not sorted. The command verifies that interfaces are present (physical) or configured (logical).

Important Points to Remember:

- Bulk configuration is created if at least one interface is valid.
- Non-existing interfaces are excluded from the bulk configuration with a warning message.
- The `interface range` prompt includes interface types with slot/port information for valid interfaces. The prompt allows for a maximum of 32 characters. If the bulk configuration exceeds 32 characters, it is represented by an ellipsis (...).
- When the `interface range` prompt has multiple port ranges, the smaller port range is excluded from the prompt.
- If overlapping port ranges are specified, the port range is extended to the smallest start port and the biggest end port.

Example (Bulk)

```
Dell(conf)#interface range so 2/0-1, te 10/0, gi 3/0, fa 0/0
% Warning: Non-existing ports (not configured) are ignored by
interface-range
```

Example (Multiple Ports)

```
Dell(conf)#interface range gi 2/0 - 23, gi 2/1 - 10
Dell(conf-if-range-gi-2/0-23#
```

Example (Overlapping Ports)

```
Dell(conf)#interface range gi 2/1 - 11, gi 2/1 - 23
Dell(conf-if-range-gi-2/1-23#
```

Usage Information

Only VLAN and port-channel interfaces created using the `interface vlan` and `interface port-channel` commands can be used in the `interface range` command.

Use the `show running-config` command to display the VLAN and port-channel interfaces. VLAN or port-channel interfaces that are not displayed in the `show running-config` command cannot be used with the bulk configuration feature of the `interface range` command. You cannot create virtual interfaces (VLAN, Port-channel) using the `interface range` command.

NOTE: If a range has VLAN, physical, port-channel, and SONET interfaces, only commands related to physical interfaces can be bulk configured. To configure commands specific to VLAN, port-channel, or SONET, only those respective interfaces should be configured in a particular range.

Example (Single Range)

This example shows a single range bulk configuration.

```
Dell(config)# interface range gigabitethernet 5/1 - 23
Dell(config-if-range)# no shutdown
Dell(config-if-range)#
```

Example (Multiple Range)

This example shows how to use commas to add different interface types to the range enabling all Gigabit Ethernet interfaces in the range 5/1 to 5/23 and both Ten-Gigabit Ethernet interfaces 1/1 and 1/2.

```
Dell(config-if)# interface range gigabitethernet5/1-23,
tengigabitethernet1/1-2
Dell(config-if-range)# no shutdown
Dell(config-if-range)#
```

Example (Multiple Range)

This example shows how to use commas to add SONET, VLAN, and port-channel interfaces to the range.

```
Dell(config-if)# interface range gigabitethernet5/1-23,
tengigabitethernet1/1-2,
Vlan 2-100, Port 1-25
Dell(config-if-range)# no shutdown
Dell(config-if-range)#
```

Related Commands

interface port-channel — configures a port channel group.

interface vlan — configures a VLAN interface.

show config (from INTERFACE RANGE mode) — shows the bulk configuration interfaces.

show range — shows the bulk configuration ranges.

interface range macro (define) — defines a macro for an interface-range.

interface range macro (define)

Defines a macro for an interface range and then saves the macro in the running configuration.

S6000

Syntax

`define interface range macro name interface , interface , ...`

Parameters

name	Enter up to 16 characters for the macro name.
interface, interface,...	Enter the keywords `interface range` and one of the interfaces — slot/port, port-channel, or VLAN number. Select the range of interfaces for bulk configuration. You can enter up to six comma-separated ranges. Spaces are not required between the commas. Comma-separated ranges can include VLANs, port-channels, and physical interfaces. Slot/Port information must contain a space before and after the dash. For example, `interface range gigabitethernet 0/1 - 5` is valid; `interface range gigabitethernet 0/1-5` is NOT valid. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.

- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a Tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383.
- For a VLAN, enter the keyword `vlan` followed by a number from 1 to 4094.

Defaults none

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.2.1.0	Added support for 4093 VLANs on E-Series ExaScale. Prior releases supported 2094.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example (Single Range)

This example shows how to define an interface range macro named test. Execute the `show running-config` command to display the macro definition.

```
Dell(config)# define interface-range test
tengigabitethernet0/0-3,
gigabitethernet 5/0-47, gigabitethernet 13/0-89

Dell# show running-config | grep define
define interface-range test tengigabitethernet0/0-3,
gigabitethernet5/0-47,
gigabitethernet 13/0 - 89
Dell(config)#interface range macro test
Dell(config-if-range-te-0/0-3,gi-5/0-47,gi-13/0-89)#
```

Related Commands	interface range – configures a range of command (bulk configuration) interface range macro name – runs an interface range macro.

interface range macro name

Run the interface-range macro to automatically configure the pre-defined range of interfaces.

S6000

Syntax `interface range macro name`

Parameters

name	Enter the name of an existing macro.

Defaults none

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.0	Introduced

Example (Single Range)

This example shows the macro named *test* that was defined earlier.

```
Dell(config)#interface range macro test
Dell(config-if-range-te-0/0-3,gi-5/0-47,gi-13/0-89)#
Dell
```

Related Commands

interface range — configures a range of command (bulk configuration).

interface range macro (define) — defines a macro for an interface range (bulk configuration).

interface vlan

Configure a VLAN. You can configure up to 4094 VLANs.

S6000

Syntax `interface vlan vlan-id [of-instance{of-id}]`

Syntax `interface vlan vlan-id`

Parameters

vlan-id	Enter a number as the VLAN Identifier. The range is from 1 to 4094.
of-instance{*of-id*}	Enter the keyword **of-instance** then the OpenFlow instance ID to add the VLAN to the specified OpenFlow instance. The range is from 1 to 8. NOTE: Associate the OpenFlow instance with the VLAN when the VLAN is created. An existing VLAN cannot be associated with an OpenFlow instance.

Defaults Not configured, except for the Default VLAN, which is configured as VLAN 1.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.1.(0.0)	Introduced on the S4810; added support for OpenFlow.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

For more information about VLANs and the commands to configure them, refer to the Virtual LAN (VLAN) Commands section of the Layer 2 chapter.

FTP, TFTP, and SNMP operations are not supported on a VLAN. MAC ACLs are not supported in VLANs. IP ACLs are supported. For more information, refer to the Access Control Lists (ACL) chapter.

The following features are not supported on VLANs associated with an OpenFlow instance:

- IPv4
- IPv6

- MTU

If OpenFlow VLANs are configured on the switch, spanning-tree protocols cannot be enabled simultaneously.

Example (Single Range)

```
Dell(conf)#int vlan 3
Dell(conf-if-vl-3)#
```

Related Commands

interface — configures a physical interface.

interface loopback — configures a loopback interface.

interface null — configures a null interface.

interface port-channel — configures a port channel group.

show vlan — displays the current VLAN configuration on the switch.

shutdown — disables/enables the VLAN.

tagged — adds a Layer 2 interface to a VLAN as a tagged interface.

untagged — adds a Layer 2 interface to a VLAN as an untagged interface.

intf-type cr4 autoneg

Set the interface type as CR4 with auto-negotiation enabled.

S6000

Syntax

`intf-type cr4 autoneg`

If you configure `intf-type cr4 autoneg`, use the `no intf-type cr4 autoneg` command to set the interface type as cr4 with autonegotiation disabled.

Defaults

Not configured

Command Modes

CONFIGURATION

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.16.1	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information	If you configure `interface type` as CR4 with auto-negotiation enabled, also configure CR4 with auto-negotiation. Many DAC cable link issues are resolved by setting the interface type as CR4.
Related Commands	• Interfaces — configures a physical interface. • interface loopback — configures a loopback interface. • interface null — configures a null interface. • interface port-channel — configures a port channel group.

keepalive

Send keepalive packets periodically to keep an interface alive when it is not transmitting data.

S6000

Syntax	`keepalive [seconds]` To stop sending keepalive packets, use the `no keepalive` command.
Parameters	*seconds* — (OPTIONAL) For SONET interfaces with PPP encapsulation enabled, enter the number of seconds between keepalive packets. The range is from 0 to 23767. The default is **10 seconds**.
Defaults	Enabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.2	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When you configure `keepalive`, the system sends a self-addressed packet out of the configured interface to verify that the far end of a WAN link is up. When you configure `no keepalive`, the system does not send keepalive packets and so the local end of a WAN link remains up even if the remote end is down.

monitor interface

Monitor counters on a single interface or all interfaces on a line card. The screen is refreshed every five seconds and the CLI prompt disappears.

S6000

Syntax

`monitor interface [`*`interface`*`]`

To disable monitoring and return to the CLI prompt, press the `q` key.

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For the management port, enter the keyword `managementethernet` then the slot (0 or 1) and the port (0). • For a Tunnel interface, enter the keyword `tunnel` then the slot/port. The range is from 1 to 16383. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then the slot/port. The range is from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

In the Example, the delta column displays changes since the last screen refresh.

The following are the `monitor` command menu options.

Key	Description
systest-3	Displays the host name assigned to the system.
monitor time	Displays the amount of time since the `monitor interface` command was entered.
time	Displays the amount of time the chassis is up (since last reboot).
m	Change the view from a single interface to all interfaces on the line card or visa-versa.
c	Refresh the view.
b	Change the counters displayed from Packets on the interface to Bytes.
r	Change the [delta] column from change in the number of packets/bytes in the last interval to rate per second.
l	Change the view to the next interface on the line card, or if in line card mode, the next line card in the chassis.
a	Change the view to the previous interface on the line card, or if in line card mode, the previous line card in the chassis.
T	Increase the screen refresh rate.
t	Decrease the screen refresh rate.
q	Return to the CLI prompt.

Example (Single Interface)

```
systest-3 Monitor time: 00:00:06 Refresh Intvl.: 2s Time:
03:26:26

Interface: Gi 0/3, Enabled, Link is Up, Linespeed is 1000 Mbit

Traffic statistics:    Current    Rate     Delta
       Input bytes:    9069828  43 Bps     86
      Output bytes:  606915800  43 Bps     86
     Input packets:      54001   0 pps      1
    Output packets:    9401589   0 pps      1
       64B packets:         67   0 pps      0
   Over 64B packets:     49166   0 pps      1
  Over 127B packets:       350   0 pps      0
  Over 255B packets:      1351   0 pps      0
  Over 511B packets:       286   0 pps      0
Over 1023B packets:      2781   0 pps      0
   Error statistics:
    Input underruns:         0   0 pps      0
```

```
      Input giants:          0   0 pps      0
   Input throttles:          0   0 pps      0
         Input CRC:          0   0 pps      0
 Input IP checksum:          0   0 pps      0
     Input overrun:          0   0 pps      0
  Output underruns:          0   0 pps      0
  Output throttles:          0   0 pps      0

  m - Change mode                c - Clear screen
  l - Page up                    a - Page down
  T - Increase refresh interval  t - Decrease refresh interval
  q - Quit
```

Example (All Interfaces)

```
systest-3 Monitor time: 00:01:31 Refresh Intvl.: 2s Time:
03:54:14

Interface  Link   In Packets   [delta] Out Packets
[delta]
   Gi 0/0  Down            0       0        0           0
   Gi 0/1  Down            0       0        0           0
   Gi 0/2  Up          61512      52     66160          42
   Gi 0/3  Up          63086      20   9405888          24
   Gi 0/4  Up    14697471418 2661481  13392989657
2661385
   Gi 0/5  Up           3759       3  161959604     832816
   Gi 0/6  Up           4070       3    8680346          5
   Gi 0/7  Up          61934      34  138734357         72
   Gi 0/8  Up          61427       1      59960          1
   Gi 0/9  Up          62039      53  104239232          3
   Gi 0/10 Up    17740044091     372  7373849244        79
   Gi 0/11 Up    18182889225      44  7184747584       138
   Gi 0/12 Up    18182682056       0        3682         1
   Gi 0/13 Up    18182681434      43  6592378911       144
   Gi 0/14 Up          61349      55    86281941        15
   Gi 0/15 Up          59808      58       62060        27
   Gi 0/16 Up          59889       1       61616         1
   Gi 0/17 Up              0       0    14950126     81293
   Gi 0/18 Up              0       0           0         0
   Gi 0/19 Down            0       0           0         0
   Gi 0/20 Up          62734      54       62766        18
   Gi 0/21 Up          60198       9      200899         9
   Gi 0/22 Up    17304741100 3157554 10102508511
1114221
   Gi 0/23 Up    17304769659 3139507 7133354895
523329
   m - Change mode        c - Clear screen
   b - Display bytes      r - Display pkts/bytes per sec
   l - Page up            a - Page down
```

mtu

Set the link maximum transmission unit (MTU) (frame size) for an Ethernet interface.

S6000

Syntax

`mtu *value*`

To return to the default MTU value, use the `no mtu` command.

Parameters

value	Enter a maximum frame size in bytes. The range is from 594 to 9252 for the S6000. The default is **1554**.

Defaults **1554**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

If the packet includes a Layer 2 header, the difference between the link MTU and IP MTU (`ip mtu` command) must be enough bytes to include the Layer 2 header.

When you enter the `no mtu` command, Dell Networking OS reduces the IP MTU value to 1536 bytes.

Link MTU and IP MTU considerations for port channels and VLANs are as follows.

port channels:

- All members must have the same link MTU value and the same IP MTU value.
- The port channel link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the channel members. For example, if the members have a link MTU of 2100 and an IP MTU 2000, the port channel's MTU values cannot be higher than 2100 for link MTU or 2000 bytes for IP MTU.

VLANs:

- All members of a VLAN must have same IP MTU value.
- Members can have different Link MTU values. Tagged members must have a link MTU 4 bytes higher than untagged members to account for the packet tag.
- The VLAN link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the VLAN members. For example, the VLAN contains tagged members with Link MTU of 1522 and IP MTU of 1500 and untagged members with Link MTU of 1518 and IP MTU of 1500. The VLAN's Link

MTU cannot be higher than 1518 bytes and its IP MTU cannot be higher than 1500 bytes.

The following shows the difference between Link MTU and IP MTU.

Layer 2 Overhead	Link MTU and IP MTU Delta
Ethernet (untagged)	18 bytes
VLAN Tag	22 bytes
Untagged Packet with VLAN-Stack Header	22 bytes
Tagged Packet with VLAN-Stack Header	26 bytes

negotiation auto

Enable auto-negotiation on an interface.

S6000

Syntax

```
negotiation auto
```

To disable auto-negotiation, use the `no negotiation auto` command.

Defaults

Enabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.0	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

This command is supported on C-Series, S-Series, and E-Series (TeraScale and ExaScale) 10/100/1000 Base-T Ethernet interfaces.

The `no negotiation auto` command is only available if you first manually set the speed of a port to **10Mbits** or **100Mbits**.

The `negotiation auto` command provides a `mode` option for configuring an individual port to forced-master/forced slave after you enable auto-negotiation.

NOTE: The `mode` option is not available on non-10/100/1000 Base-T Ethernet line cards.

If you do not use the `mode` option, the default setting is **slave**. If you do not configure forced-master or forced-slave on a port, the port negotiates to either a master or a slave state. Port status is one of the following:

- Forced-master
- Force-slave
- Master
- Slave
- Auto-neg Error — typically indicates that both ends of the node are configured with forced-master or forced-slave.

CAUTION: Ensure that one end of your node is configured as forced-master and one is configured as forced-slave. If both are configured the same (that is, forced-master or forced-slave), the `show interfaces` command flaps between an auto-neg-error and forced-master/slave states.

You can display master/slave settings with the `show interfaces` command.

Example (Master/Slave)

```
Dell(conf)# int gi 0/0
Dell(conf-if)#neg auto
Dell(conf-if-autoneg)# ?

end          Exit from configuration mode
exit         Exit from autoneg configuration mode
mode         Specify autoneg mode
no           Negate a command or set its defaults
show         Show autoneg configuration information
Dell(conf-if-autoneg)#mode ?
forced-master Force port to master mode
forced-slave  Force port to slave mode
Dell(conf-if-autoneg)#
```

Example (Configured)

```
Dell#show interfaces configured
GigabitEthernet 13/18 is up, line protocol is up
Hardware is Force10Eth, address is 00:01:e8:05:f7:fc
   Current address is 00:01:e8:05:f7:fc
Interface index is 474791997
Internet address is 1.1.1.1/24
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit, Mode full duplex, Master
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interfaces" counters 00:12:42
Queueing strategy: fifo
```

```
Input Statistics:
...
```

User Information

Both sides of the link must have auto-negotiation enabled or disabled for the link to come up.

The following details the possible speed and auto-negotiation combinations for a line between two 10/100/1000 Base-T Ethernet interfaces.

Port 0

- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled* speed 1000 or auto

Port 1

- auto-negotiation enabled* speed 1000 or auto
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100
- auto-negotiation enabled speed 100
- auto-negotiation disabled speed 100

Link Status Between Port 1 and Port 2

- Up at 1000 Mb/s
- Up at 100 Mb/s
- Up at 100 Mb/s
- Down
- Down

* You cannot disable auto-negotiation when the speed is set to 1000 or auto.

portmode hybrid

To accept both tagged and untagged frames, set a physical port or port-channel. A port configured this way is identified as a hybrid port in report displays.

S6000

Syntax

```
portmode hybrid
```

To return a port to accept either tagged or untagged frames (non-hybrid), use the `no portmode hybrid` command.

Defaults

non-hybrid

Command Modes

INTERFACE (conf-if-interface-slot/port)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Usage Information

The following describes the `interface` command shown in the following example. This example sets a port as hybrid, makes the port a tagged member of VLAN 20, and an untagged member of VLAN 10, which becomes the native VLAN of the port. The port now accepts:

- untagged frames and classify them as VLAN 10 frames
- VLAN 20 tagged frames

The following describes the `do show interfaces` command shown in the following example. This example shows output with "Hybrid" as the newly added value for 802.1QTagged. The options for this field are:

- True — port is tagged
- False — port is untagged
- Hybrid — port accepts both tagged and untagged frames

The following describes the `interface vlan` command shown in the following example. This example shows unconfiguration of the hybrid port using the `no portmode hybrid` command.

NOTE: Remove all other configurations on the port before you can remove the hybrid configuration from the port.

Example

```
Dell(conf)#interface gi 7/0
Dell(conf-if-gi-7/0)#portmode hybrid
Dell(conf-if-gi-7/0)#interface vlan 10
Dell(conf-if-vl-10)#untagged gi 7/0
Dell(conf-if-vl-10)#interface vlan 20
Dell(conf-if-vl-20)#tagged gi 7/0
Dell(conf-if-vl-20)#
```

Example

```
Dell(conf-if-vl-20)#do show interfaces switchport
Name: GigabitEthernet 7/0
802.1QTagged: Hybrid
Vlan membership:
Vlan  10,   Vlan 20
```

```
Native   VlanId: 10
Dell(conf-if-vl-20)#
```

Example (Vlan)

```
Dell(conf-if-vl-20)#interface vlan 10
Dell(conf-if-vl-10)#no untagged gi 7/0
Dell(conf-if-vl-10)#interface vlan 20
Dell(conf-if-vl-20)#no tagged gi 7/0
Dell(conf-if-vl-20)#interface gi 7/0
Dell(conf-if-gi-7/0)#no portmode hybrid
Dell(conf-if-vl-20)#
```

Related Commands

show interfaces switchport — displays the configuration of switchport (Layer 2) interfaces on the switch.

switchport — places the interface in a Layer 2 mode.

vlan-stack trunk — specifies an interface as a trunk port to the Stackable VLAN network.

rate-interval

Configure the traffic sampling interval on the selected interface.

S6000

Syntax `rate-interval seconds`

Parameters

seconds	Enter the number of seconds for which to collect traffic data. The range is from 5 to 299 seconds. NOTE: Because polling occurs every 15 seconds, the number of seconds designated here rounds to the multiple of 15 seconds lower than the entered value. For example, if 44 seconds is designated, it rounds to 30; 45 to 59 seconds rounds to 45.

Defaults **299 seconds**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced

Usage Information	The output of the `show interfaces` command displays the configured rate interval, along with the collected traffic data.
Related Commands	show interfaces — displays information on physical and virtual interfaces.

show config

Display the interface configuration.

S6000

Syntax	`show config`
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Example

```
Dell(conf-if-fo-0/4)#show config
!
interface fortyGigE 0/4
 no ip address
 mtu 12000
 switchport
 no shutdown
Dell(conf-if-fo-0/4)#
```

show config (for speed)

S6000

Syntax `show config`

Command Modes Dell(conf-if-te-2/10)#show config

Command History

Version 9.3(0.1)	Introduced on the S6000.

Example

```
Dell(conf-if-te-0/0)#speed ?
10 10 Mbps
100 100 Mbps
1000 1000 Mbps
Dell(conf-if-te-0/0)#speed 100
Dell(conf-if-te-2/10)#show config
interface TenGigabitEthernet 2/10
speed 100
no shutdown
```

show config (from INTERFACE RANGE mode)

Display the bulk configured interfaces (`interface range`).

S6000

Syntax `show config`

Command Modes CONFIGURATION INTERFACE (conf-if-range)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell(conf)#interface range gigabitethernet 1/1 - 2
Dell(conf-if-range-gi-1/1-2)#show config
!
interface GigabitEthernet 1/1
  no ip address
  switchport
  no shutdown
!
interface GigabitEthernet 1/2
  no ip address
  switchport
  no shutdown
Dell(conf-if-range-gi-1/1-2)#
```

show interfaces

Display information on a specific physical interface or virtual interface.

S6000

Syntax `show interfaces` *`interface`*

Parameters

interface	Enter one of the following keywords and slot/port or number information: • For a Loopback interface, enter the keyword `loopback` followed by a number from 0 to 16383. • For stack-units, enter the keywords `stack-unit` then the slot/port information. The range is from 0 to 11. • For a Null interface, enter the keywords `null 0`. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094. • For a tunnel interface, enter the keyword `tunnel` then the tunnel ID. The range is from 1 to 16383.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.2)	Added support for the tunnel interface type.
Version 9.1(0.0)	Updated ManagementEthernet output to include two global IPv6 addresses on S4810 and Z9000 and added output example showing OpenFlow instance ID.

Version 8.3.12.1	Updated command output to support multiple IPv6 addresses on S4810.
Version 8.3.11.4	Output expanded to support eSR4 optics in Z9000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.2	Included SFP and SFP+ optics power detail in the E-Series and C-Series output.
Version 8.2.1.0	Added support for 4093 VLANs on the E-Series ExaScale. Prior releases supported 2094.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Output expanded to include SFP+ media on the C-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Changed the organization of the display output.
Version 6.3.1.0	Added the Pluggable Media Type field in the E-Series TeraScale output.

Usage Information

Use the `show interfaces` command for details on a specific interface.

In the output of the `show interfaces managementEthernet` *`slot/port`* command, the value displayed for the bytes field under the Input Statistics section is 4 bytes less for each packet that is received (inbound) by the interface. For example, if 1000 packets, with each packet being 64 bytes in size, arrive at the interface, the bytes count is displayed as 6000. The lower value for the byte statistical counter is because of 4 bytes being discarded for each packet from the computation.

NOTE: In the CLI output, the power value is rounded to a 3-digit value. For receive/transmit power that is less than 0.000, an `snmp query` returns the corresponding dbm value even though the CLI displays as 0.000.

NOTE: After the counters are cleared, the line-rate continues to increase until it reaches the maximum line rate. When the maximum line rate is reached, there is no change in the line-rate.

User Information

The following table describes the `show interfaces` command shown in the 10G (TeraScale) Example below.

Line	Description
TenGigabitEthernet 0/0...	Interface type, slot/port, and administrative and line protocol status.

Line	Description
Hardware is…	Interface hardware information, assigned MAC address, and current address.
Pluggable media present…	Present pluggable media wavelength, type, and rate. The error scenarios are: • Wavelength, Non-qualified — Dell Force10 ID is not present, but wavelength information is available from XFP or SFP serial data • Wavelength, F10 unknown—Dell Force10 ID is present, but not able to determine the optics type • Unknown, Non-qualified— if wavelength is reading error, and F10 ID is not present Dell Networking allows unsupported SFP and XFP transceivers to be used, but Dell Networking OS might not be able to retrieve some data about them. In that case, typically when the output of this field is “Pluggable media present, Media type is unknown”, the Medium and the XFP/SFP receive power reading data might not be present in the output.
Interface index…	Displays the interface index number used by SNMP to identify the interface.
Internet address…	States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.
MTU 1554…	Displays link and IP MTU information.
LineSpeed	Displays the interface’s line speed, duplex mode, and Slave.
ARP type:…	Displays the ARP type and the ARP timeout value for the interface.
Last clearing…	Displays the time when the `show interfaces` counters where cleared.
Queuing strategy…	States the packet queuing strategy. FIFO means first in first out.
Input Statistics:	Displays all the input statistics including: • Number of packets and bytes into the interface • Number of packets with VLAN tagged headers • Packet size and the number of those packets inbound to the interface • Number of Multicast and Broadcast packets: – Multicasts = number of MAC multicast packets – Broadcasts = number of MAC broadcast packets • Number of runts, giants, and throttles packets: – runts = number of packets that are less than 64B

Line	Description
	– giants = packets that are greater than the MTU size – throttles = packets containing PAUSE frames • Number of CRC, overrun, and discarded packets: – CRC = packets with CRC/FCS errors – overrun = number of packets discarded due to FIFO overrun conditions – discarded = the sum of runts, giants, CRC, and overrun packets discarded without any processing
Output Statistics:	Displays output statistics sent out of the interface including: • Number of packets, bytes, and underruns out of the interface • Packet size and the number of those packets outbound to the interface • Number of Multicast, Broadcast, and Unicast packets: – Multicasts = number of MAC multicast packets – Broadcasts = number of MAC broadcast packets – Unicasts = number of MAC unicast packets • Number of VLANs, throttles, discards, and collisions:: – Vlans = number of VLAN tagged packets – throttles = packets containing PAUSE frames – discarded = number of packets discarded without any processing – collisions = number of packet collisions – wred=count both packets discarded in the MAC and in the hardware-based queues
Rate information...	Estimate of the input and output traffic rate over a designated interval (30 to 299 seconds). Traffic rate is displayed in bits, packets per second, and percent of line rate.
Time since...	Elapsed time since the last interface status change (hh:mm:ss format).

Example

```
Dell#show interfaces
TenGigabitEthernet 2/0 is down, line protocol is down
Hardware is DellForce10Eth, address is 00:01:e8:8b:3d:e7
Current address is 00:01:e8:8b:3d:e7
Pluggable media present, Media type is unknown
Wavelength unknown
Interface index is 100992002
Internet address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed auto
Flowcontrol rx on tx off
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 3d17h53m
```

```
Queueing strategy: fifo
Input Statistics:
  0 packets, 0 bytes
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  0 packets, 0 bytes, 0 underruns
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts, 0 Unicasts
  0 throttles, 0 discarded, 0 collisions, 0 wreddrops
Rate info (interval 299 seconds):
  Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Time since last interface status change: 3d17h51m
```

Usage Information

The Management port is enabled by default (`no shutdown`). If necessary, use the `ip address` command to assign an IP address to the Management port. If two RPMs are installed in your system, use the `show redundancy` command to display which RPM is the Primary RPM.

Example (1G SFP)

```
Dell#show interfaces gigabitethernet 2/0
GigabitEthernet 2/0 is up, line protocol is down
Hardware is Force10Eth, address is 00:01:e8:41:77:95
  Current address is 00:01:e8:41:77:95
Pluggable media present, SFP type is 1000BASE-SX
  Wavelength is 850nm
Interface index is 100974648
Port will not be disabled on partial SFM failure
Internet address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit
Flowcontrol rx on tx on
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 1w0d5h
Queueing strategy: fifo
Input Statistics:
  0 packets, 0 bytes
  0 Vlans
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  0 packets, 0 bytes, 0 underruns
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts, 0 Unicasts
  0 Vlans, 0 throttles, 0 discarded, 0 collisions, 0 wreddrops
Rate info (interval 299 seconds):
  Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 00.00 Mbits/sec, 0 packets/sec,0.00% of line-rate
```

```
Time since last interface status change: 1w0d5h
Dell#
```

Example (ManagementEthernet)

```
Dell#show interfaces managementethernet 0/0

ManagementEthernet 0/0 is up, line protocol is up
Hardware is Force10Eth, address is 00:01:e8:0b:a9:4c
  Current address is 00:01:e8:0b:a9:4c
Pluggable media not present
Interface index is 503595208
Internet address is 10.11.201.5/16
Link local IPv6 address: fe80::201:e8ff:fe0b:a94c/64
Global IPv6 address: 2222::5/64
Virtual-IP is not set
Virtual-IP IPv6 address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 10 Mbit, Mode half duplex
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 04:01:08
Queueing strategy: fifo
  Input 943 packets, 78347 bytes, 190 multicast
  Received 0 errors, 0 discarded
  Output 459 packets, 102388 bytes, 15 multicast
  Output 0 errors, 0 invalid protocol
Time since last interface status change: 00:03:09
```

Example (ManagementEthernet, two IPv6 addresses)

```
Dell#show interfaces managementethernet 0/0

ManagementEthernet 0/0 is up, line protocol is up

Hardware is DellForce10Eth, address is 00:01:e8:a0:bf:f3

Current address is 00:01:e8:a0:bf:f3

Pluggable media not present

Interface index is 302006472

Internet address is 10.16.130.5/16

Link local IPv6 address: fe80::201:e8ff:fea0:bff3/64

Global IPv6 address: 1::1/

Global IPv6 address: 2::1/64

Virtual-IP is not set

Virtual-IP IPv6 address is not set

MTU 1554 bytes, IP MTU 1500 bytes

LineSpeed 1000 Mbit, Mode full duplex

ARP type: ARPA, ARP Timeout 04:00:00
```

```
Last clearing of "show interface" counters 00:06:14

Queueing strategy: fifo

Input 791 packets, 62913 bytes, 775 multicast

Received 0 errors, 0 discarded

Output 21 packets, 3300 bytes, 20 multicast

Output 0 errors, 0 invalid protocol

Time since last interface status change: 00:06:03
```

Example (OpenFlow instance)

```
Dell#show interfaces vlan 6

Vlan 6 is down, line protocol is down

Address is 00:01:e8:8a:e1:8c, Current address is
00:01:e8:8a:e1:8c

Interface index is 1107525638

of-instance: 2

Internet address is not set

MTU 1554 bytes, IP MTU 1500 bytes

LineSpeed auto

ARP type: ARPA, ARP Timeout 04:00:00

Last clearing of "show interface" counters 00:05:12

Queueing strategy: fifo

Time since last interface status change: 00:05:12
```

Related Commands

show interfaces configured – displays any interface with a non-default configuration.

show interfaces switchport – displays Layer 2 information about the interfaces.

show inventory (S-Series and Z-Series) – displays the S-Series and Z-Series switch types, components (including media), Dell Networking OS version including hardware identification numbers, and configured protocols.

show range – displays all interfaces configured using the interface range command.

show interfaces configured

Display any interface with a non-default configuration.

S6000

Syntax `show interfaces configured`

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Changed the organization of the display output.

Example

```
Dell#show interfaces configured
GigabitEthernet 13/18 is up, line protocol is up
Hardware is Force10Eth, address is 00:01:e8:05:f7:fc
  Current address is 00:01:e8:05:f7:fc
Interface index is 474791997
Internet address is 1.1.1.1/24
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed 1000 Mbit, Mode full duplex, Master
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interfaces" counters 00:12:42
Queueing strategy: fifo
Input Statistics:
  10 packets, 10000 bytes
  0 Vlans
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 10 over 511-byte pkts, 0 over 1023-
byte pkts
  0 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  1 packets, 64 bytes, 0 underruns
  1 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 1 Broadcasts, 0 Unicasts
  0 Vlans, 0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
  Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
```

```
Time since last interface status change: 00:04:59
Dell#
```

Related Commands	show interfaces — displays information on a specific physical interface or virtual interface.

show interfaces dampening

Display interface dampening information.

S6000

Syntax `show interfaces dampening [[interface] [summary] [detail]]`

Parameters

interface	(Optional) Enter one of the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
summary	(OPTIONAL) Enter the keyword `summary` to display the current summary of dampening data, including the number of interfaces configured and the number of interfaces suppressed, if any.
detail	(OPTIONAL) Enter the keyword `detail` to display detailed interface dampening data.

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced

Example

```
Dell#show interfaces dampening
Interface Supp   Flaps Penalty Half-Life Reuse Suppress Max-Sup
          State
Gi 3/2    Up     0     0        20        800   4500     120
Gi 3/10   Up     0     0        5         750   2500     20
Dell#
```

Related Commands

dampening — configures dampening on an interface.

show interfaces — displays information on a specific physical interface or virtual interface.

show interfaces configured — displays any interface with a non-default configuration.

show interfaces stack-unit

Display information on all interfaces on a specific S-Series or Z-Series stack member.

S6000

Syntax

```
show interfaces stack-unit unit-number
```

Parameters

unit-number	Enter the stack member number. The range is from 0 to 5 for the S6000

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.

Example

```
Dell#show interfaces stack-unit 0
GigabitEthernet 0/1 is down, line protocol is down
Hardware is Force10Eth, address is 00:01:e8:4c:f2:82
  Current address is 00:01:e8:4c:f2:82
Pluggable media not present
Interface index is 34129154
Internet address is not set
MTU 1554 bytes, IP MTU 1500 bytes
LineSpeed auto, Mode auto
ARP type: ARPA, ARP Timeout 04:00:00
Last clearing of "show interface" counters 3w0d17h
Queueing strategy: fifo
Input Statistics:
  0 packets, 0 bytes
  5144 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts
  0 runts, 0 giants, 0 throttles
  0 CRC, 0 overrun, 0 discarded
Output Statistics:
  0 packets, 0 bytes, 0 underruns
  0 64-byte pkts, 0 over 64-byte pkts, 0 over 127-byte pkts
  0 over 255-byte pkts, 0 over 511-byte pkts, 0 over 1023-byte
pkts
  0 Multicasts, 0 Broadcasts, 0 Unicasts
  0 throttles, 0 discarded, 0 collisions
Rate info (interval 299 seconds):
  Input 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
  Output 00.00 Mbits/sec, 0 packets/sec, 0.00% of line-rate
Time since last interface status change: 3w0d17h
 GigabitEthernet 0/2 is down, line protocol is down
Hardware is Force10Eth, address is 00:01:e8:4c:f2:83
  Current address is 00:01:e8:4c:f2:83
!-------------output truncated ----------------!
```

Related Commands

show hardware stack-unit — displays data plane and management plane input/output statistics.

show interfaces — displays information on a specific physical interface or virtual interface.

show interfaces status

To display status information on a specific interface only, display a summary of interface information or specify a stack-unit slot and interface.

S6000

Syntax

`show interfaces [interface | linecard slot-number] status`

`show interfaces [interface | stack—unit slot-number] status`

Parameters

interface	(OPTIONAL) Enter one of the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a Loopback interface, enter the keyword `loopback` then the slot/port information. The range is from 0 to 16383.
- For a Port-Channel interface, enter the keyword `port-channel` then the slot/port information. The range is from 0 to 128.

linecard *slot-number*	(OPTIONAL) Enter the keyword `linecard` then the slot number.
stack-unit *slot-number*	(OPTIONAL) Enter the keyword `stack-unit` then the slot number. The range is from 0 to 5.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.5.1.0	Introduced on the E-Series.

Example

```
Dell#show interfaces status
Port    Description  Status  Speed     Duplex  Vlan
Gi 0/0               Up      1000 Mbit Auto    --
Gi 0/1               Down    Auto      Auto    1
Gi 0/2               Down    Auto      Auto    1
Gi 0/3               Down    Auto      Auto    --
Gi 0/4  DellPort  Up      1000 Mbit Auto    30-130
Gi 0/5               Down    Auto      Auto    --
Gi 0/6               Down    Auto      Auto    --
Gi 0/7               Up      1000 Mbit Auto
1502,1504,1506-1508,1602
Gi 0/8               Down    Auto      Auto    --
Gi 0/9               Down    Auto      Auto    --
Gi 0/10              Down    Auto      Auto    --
Gi 0/11                 Down     Auto       Auto     --
Gi 0/12                 Down     Auto       Auto     --
Gi 0/13                 Down     Auto       Auto     --
Gi 0/14                 Down     Auto       Auto     --
Gi 0/15                 Down     Auto       Auto     -
Dell#
```

Related Commands	show interfaces — displays information on a specific physical interface or virtual interface.

show interfaces switchport

Display only virtual and physical interfaces in Layer 2 mode. This command displays the Layer 2 mode interfaces' IEEE 802.1Q tag status and VLAN membership.

S6000

Syntax `show interfaces switchport [interface | stack-unit unit-id ]`

Parameters

interface	(OPTIONAL) Enter one of the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • Enter the keyword `backup` to view the backup interface for this interface.
stack-unit *unit-id*	(OPTIONAL) Enter the keywords `stack-unit` then the stack member number. This option is available only on S-Series. The range is from 0 to 5.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.2.1.0	Added support for 4093 VLANs on E-Series ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Support added for hybrid port/native VLAN, introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The following describes the `show interfaces switchport` command for the following example.

Items	Description
Name	Displays the interface's type, slot, and port number.
802.1QTagged	Displays whether if the VLAN tagged ("True"), untagged ("False"), or hybrid ("Hybrid"), which supports both untagged and tagged VLANs by port 13/0.
Vlan membership	Lists the VLANs to which the interface is a member. Starting with Dell Networking OS version 7.6.1, this field can display native VLAN membership by port 13/0.

Example

```
Dell#show interfaces switchport
Name: GigabitEthernet 13/0
802.1QTagged: Hybrid
Vlan membership:
Vlan   2, Vlan 20
Native VlanId: 20

Name: GigabitEthernet 13/1
802.1QTagged: True
Vlan membership:
Vlan   2

Name: GigabitEthernet 13/2
802.1QTagged: True
Vlan membership:
Vlan   2

Name: GigabitEthernet 13/3
802.1QTagged: True
Vlan membership:
Vlan   2
--More--
```

Related Commands

interface — configures a physical interface on the switch.

show ip interface — displays Layer 3 information about the interfaces.

show interfaces — displays information on a specific physical interface or virtual interface.

show interfaces transceiver — displays the physical status and operational status of an installed transceiver. The output also displays the transceiver’s serial number.

show interfaces transceiver

Display the physical status and operational status of an installed transceiver. The output also displays the transceiver’s serial number.

S6000

Syntax

```
show interfaces [tengigabitethernet slot/port | fortyGigE slot/
port] transceiver
```

Parameters

tengigabitethernet	For a 10G interface, enter the keyword `tengigabitethernet` then the slot/port information.
fortyGigE	For a 40G interface, enter the keyword `fortyGigE` then the slot/port information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on theS6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Output augmented with diagnostic data for pluggable media.
Version 7.7.1.0	Removed three fields in the output: Vendor Name, Vendor OUI, and Vendor PN.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 6.5.4.0	Introduced on the E-Series.

Usage Information

The following describes the `show interfaces transceiver` command shown in the following example.

Line	Description
Rx Power measurement type	Output depends on the vendor, typically either “Average” or “OMA” (Receiver optical modulation amplitude).
Temp High Alarm threshold	Factory-defined setting, typically in Centigrade. Value differs between SFPs and SFP+.
Voltage High Alarm threshold	Displays the interface index number used by SNMP to identify the interface.
Bias High Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
TX Power High Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
RX Power High Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temp Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Voltage Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Bias Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
TX Power Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
RX Power Low Alarm threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temp High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Voltage High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Bias High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
TX Power High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
RX Power High Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temp Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Voltage Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Bias Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.

Line	Description
TX Power Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Power Low Warning threshold	Factory-defined setting. Value can differ between SFP and SFP+.
Temperature	Current temperature of the SFPs. If this temperature crosses Temp High alarm/warning thresholds, the temperature high alarm/warning flag is set to true.
Voltage	Current voltage of the SFPs. If this voltage crosses voltage high alarm/warning thresholds, the voltage high alarm/ warning flag is set to true.
Tx Bias Current	Present transmission (Tx) bias current of the SFP. If this crosses bias high alarm/warning thresholds, the TX bias high alarm/warning flag is set to true. If it falls below the low alarm/warning thresholds, the TX bias low alarm/warning flag is set to true.
Tx Power	Present Tx power of the SFP. If this crosses Tx power alarm/ warning thresholds, the Tx power high alarm/warning flag is set to true. If it falls below the low alarm/warning thresholds, the Tx power low alarm/ warning flag is set to true.
Rx Power	Present receiving (Rx) power of the SFP. This value is either average Rx power or OMA. This depends on the Rx Power measurement type displayed above. If this crosses Rx power alarm/warning thresholds, the Rx power high alarm/warning flag is set to true. If it falls below the low alarm/warning thresholds, the Rx power low alarm/warning flag is set to true.
Data Ready state Bar	This field indicates that the transceiver has achieved power up and data is ready. This is set to true if data is ready to be sent and set to false if data is being transmitted.
Rx LOS state	This is the digital state of the Rx_LOS output pin. This is set to true if the operating status is down.
Tx Fault state	This is the digital state of the Tx Fault output pin.
Rate Select state	This is the digital state of the SFP rate_select input pin.
RS state	This is the reserved digital state of the pin AS(1) per SFF-8079 and RS(1) per SFF-8431.
Tx Disable state	If the admin status of the port is down then this flag is set to true.
Temperature High Alarm Flag	This can be either true or false, depending on the Current voltage value displayed above.

Line	Description
Voltage High Alarm Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Tx Bias High Alarm Flag	This can be either true or false, depending on the present Tx bias current value displayed above.
Tx Power High Alarm Flag	This can be either true or false, depending on the Current Tx bias power value displayed above.
Rx Power High Alarm Flag	This can be either true or false, depending on the Current Rx power value displayed above.
Temperature Low Alarm Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Voltage Low Alarm Flag	This can be either true or false, depending on the Current voltage value displayed above.
Tx Bias Low Alarm Flag	This can be either true or false, depending on the Tx bias current value displayed above.
Tx Power Low Alarm Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Rx Power Low Alarm Flag	This can be either true or false, depending on the Current Rx power value displayed above.
Temperature High Warning Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Voltage High Warning Flag	This can be either true or false, depending on the Current Voltage value displayed above.
Tx Bias High Warning Flag	This can be either true or false, depending on the Tx bias current value displayed above.
Tx Power High Warning Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Rx Power High Warning Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Temperature Low Warning Flag	This can be either true or false, depending on the Current Temperature value displayed above.
Voltage Low Warning Flag	This can be either true or false, depending on the Current Voltage value displayed above.
Tx Bias Low Warning Flag	This can be either true or false, depending on the present Tx bias current value displayed above.
Tx Power Low Warning Flag	This can be either true or false, depending on the Current Tx power value displayed above.
Rx Power Low Warning Flag	This can be either true or false, depending on the Current Rx power value displayed above.

Example

```
Dell#show interfaces gigabitethernet 1/0 transceiver
SFP is present.

SFP 0 Serial Base ID fields
SFP 0 Id                  = 0x03
SFP 0 Ext Id              = 0x04
SFP 0 Connector           = 0x07
SFP 0 Transciever Code = 0x00 0x00 0x00 0x01 0x20 0x40 0x0c
0x05
SFP 0 Encoding            = 0x01
SFP 0 BR Nominal          = 0x15
SFP 0 Length(9um) Km      = 0x00
SFP 0 Length(9um) 100m    = 0x00
SFP 0 Length(50um) 10m    = 0x1e
SFP 0 Length(62.5um) 10m  = 0x0f
SFP 0 Length(Copper) 10m  = 0x00
SFP 0 Vendor Rev          = A
SFP 0 Laser Wavelength    = 850 nm
SFP 0 CheckCodeBase       = 0x66
SFP 0 Serial Extended ID fields
SFP 0 Options             = 0x00 0x12
SFP 0 BR max= 0
SFP 0 BR min= 0
SFP 0 Vendor SN= P5N1ACE
SFP 0 Datecode            = 040528
SFP 0 CheckCodeExt        = 0x5b

SFP 1 Diagnostic Information
===================================
SFP 1 Rx Power measurement type     = Average
===================================
SFP 1 Temp High Alarm threshold       = 95.000C
SFP 1 Voltage High Alarm threshold    = 3.900V
SFP 1 Bias High Alarm threshold       = 17.000mA
SFP 1 TX Power High Alarm threshold   = 0.631mW
SFP 1 RX Power High Alarm threshold   = 1.259mW
SFP 1 Temp Low Alarm threshold        = -25.000C
SFP 1 Voltage Low Alarm threshold     = 2.700V
SFP 1 Bias Low Alarm threshold        = 1.000mA
SFP 1 TX Power Low Alarm threshold    = 0.067mW
SFP 1 RX Power Low Alarm threshold    = 0.010mW
===================================
SFP 1 Temp High Warning threshold     = 90.000C
SFP 1 Voltage High Warning threshold  = 3.700V
SFP 1 Bias High Warning threshold     = 14.000mA
SFP 1 TX Power High Warning threshold = 0.631mW
SFP 1 RX Power High Warning threshold = 0.794mW
SFP 1 Temp Low Warning threshold      = -20.000C
SFP 1 Voltage Low Warning threshold   = 2.900V
SFP 1 Bias Low Warning threshold      = 2.000mA
SFP 1 TX Power Low Warning threshold  = 0.079mW
SFP 1 RX Power Low Warning threshold  = 0.016mW
===================================
SFP 1 Temperature                     = 39.930C
SFP 1 Voltage                         = 3.293V
SFP 1 Tx Bias Current                 = 6.894mA
SFP 1 Tx Power                        = 0.328mW
SFP 1 Rx Power                        = 0.000mW
===================================
SFP 1 Data Ready state Bar            = False
SFP 1 Rx LOS state                    = True
SFP 1 Tx Fault state                  = False
SFP 1 Rate Select state               = False
SFP 1 RS state                          = False
SFP 1 Tx Disable state                  = False
===================================
SFP 1 Temperature High Alarm Flag       = False
SFP 1 Voltage High Alarm Flag           = False
SFP 1 Tx Bias High Alarm Flag           = False
SFP 1 Tx Power High Alarm Flag          = False
SFP 1 Rx Power High Alarm Flag          = False
SFP 1 Temperature Low Alarm Flag        = False
SFP 1 Voltage Low Alarm Flag            = False
SFP 1 Tx Bias Low Alarm Flag            = False
SFP 1 Tx Power Low Alarm Flag           = False
SFP 1 Rx Power Low Alarm Flag           = True
===================================
!-------output truncated -------------------------!
```

Related Commands

interface — configures a physical interface on the switch.

show ip interface — displays Layer 3 information about the interfaces.

show interfaces — displays information on a specific physical interface or virtual interface.

show inventory (S-Series and Z-Series) — displays the switch type, components (including media), Dell Networking OS version including hardware identification numbers and configured protocols.

show range

Display all interfaces configured using the `interface range` command.

S6000

Syntax `show range`

Command Modes INTERFACE RANGE (config-if-range)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4093 VLANs on E-Series ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced.

Example

```
Dell(conf-if-range-so-2/0-1,fa-0/0)#show range
interface sonet 2/0 - 1
interface fastethernet 0/0
Dell(conf-if-range-so-2/0-1,fa-0/0)#
```

Related Commands

interface — configures a physical interface on the switch.

show ip interface — displays Layer 3 information about the interfaces.

show interfaces — displays information on a specific physical interface or virtual interface.

shutdown

Disable an interface.

S6000

Syntax

`shutdown`

To activate an interface, use the `no shutdown` command.

Defaults The interface is disabled.

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information	The `shutdown` command marks a physical interface as unavailable for traffic. To discover if an interface is disabled, use the `show ip interface brief` command. Disabled interfaces are listed as down. Disabling a VLAN or a port channel causes different behavior. When a VLAN is disabled, the Layer 3 functions within that VLAN are disabled. Layer 2 traffic continues to flow. Entering the `shutdown` command on a port channel disables all traffic on the port channel and the individual interfaces within the port channel. To enable a port channel, enter `no shutdown` on the port channel interface and at least one interface within that port channel. The `shutdown` and `description` commands are the only commands that you can configure on an interface that is a member of a port channel.
Related Commands	interface port-channel — creates a port channel interface. interface vlan — creates a VLAN. show ip interface — displays the interface routing status. Add the keyword `brief` to display a table of interfaces and their status.

speed (Management interface)

Set the speed for the Management interface.

S6000

Syntax	`speed {10 | 100 | 1000 | auto}` To return to the default setting, use the `no speed` command.

Parameters

10	Enter the keyword `10` to set the interface's speed to 10 Mb/s.
100	Enter the keyword `100` to set the interface's speed to 10/100 Mb/s.
1000	Enter the keyword `1000` to set the interface to auto-negotiate its speed.
auto	Enter the keyword `auto` to set the interface to auto-negotiate its speed.

Defaults	**auto**
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.11.1	Introduced on the S55, S60, and S4810
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

This command is found on the Management interface only.

When manually configuring the management port speed the user must consider and match the remote device. It is highly recommended to use Auto-Negotiation for management ports.

Related Commands

interface ManagementEthernet — configures the Management port on the system (either the Primary or Standby RPM).

duplex (10/100 Interfaces) — configures duplex mode on physical interfaces with the speed set to 10/100.

management route — configures a static route that points to the Management interface or a forwarding router.

stack-unit portmode

You can split a single 40G port into four-10G ports.

S6000

Syntax

```
stack-unit stack-unit port number portmode quad
```

Parameters

stack-unit	Enter the stack member unit identifier of the stack member to reset. For the S6000, the range is from 0 to 5.
number	Enter the port number of the 40G port to be split. Enter one of the following port numbers: 48, 52, 56, or 60.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.

Usage Information

Splitting a 40G port into 4x10G port is supported on standalone and stacked units.

The quad port must be in a default configuration before it can be split into 4x10G ports. The 40G port is lost in the config when the port is split, so be sure that the port is also removed from other L2/L3 feature configurations.

The system must be reloaded after issuing the CLI for the change to take effect.

This command cannot be used if LR4 optics are inserted on the 40G interface.

The following guidelines apply to the splitting of 40GbE QSFP+ ports into four 10GbE SFP+ ports by using the `stack-unit portmode` command on the S6000 platform.

- When 26 ports are configured as fan-out, 6 ports are disabled. For disabled ports, interfaces are not created.
- Support is added to configure a disabled port as a fan-out port, when the maximum limit is not exceeded. This behavior reduces the number of reloads required to configure a disabled port in quad mode to non-quad mode (negate the splitting).
- When you configure 13 ports as fan-out, a warning message is displayed stating that the maximum number of ports that can be configured in quad mode in the range has been reached. Ports X,Y,Z will be disabled on reload” (Range <0-60> & <64 - 124>) .
- When you attempt to configure fan-out on the ports on which fan-out functionality is not supported, an appropriate warning message is generated stating that quad-mode ports limit has been reached and that additional ports cannot be configured.

Example (stack unit – Warning message when 13 ports are configured in any port range)

```
Dell(conf)#stack-unit 0 po 48 po q
Maximum number of ports that can be made Quad mode in the
range <0-63> is configured. Ports 52,56,60, will be disabled
on reload.
Do you wish to continue? [confirm yes/no]:yes
Please save and reset unit 0 for the changes to take effect.
Dell(conf)#
```

switchport

Place an interface in Layer 2 mode.

S6000

Syntax

`switchport [backup interface {gigabit` *`slot/port`* `| tengigabit` *`slot/port`* `| fortyGigE` *`slot/port`* `| port-channel` *`number`*`}]`

To remove an interface from Layer 2 mode and place it in Layer 3 mode, enter the `no switchport` command. If a switchport backup interface is configured, first remove the backup configuration. To remove a switchport backup interface, enter the `no switchport backup interface {gigabit slot/port | tengigabit slot/port | fortyGigE slot/port | port-channel number}` command.

Parameters

backup interface	Use this option to configure a redundant Layer 2 link without using Spanning Tree. The keywords `backup interface` configures a backup port so that if the primary port fails, the backup port changes to the up state. If the primary later comes up, it becomes the backup.
gigabit	Enter the keyword `gigabit` if the backup port is a 1G port.
tengigabit	Enter the keyword `tengigabit` if the backup port is a 10G port.
fortyGigE	Enter the keyword `fortyGigE` if the backup port is a 40G port.
port-channel	Enter the keywords `port-channel` if the backup port is a static or dynamic port channel.
slot/port	Specify the line card and port number of the backup port.

Defaults Disabled (The interface is in Layer 3 mode.)

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.4.1.0	Added support for port-channel interfaces (the `port-channel number` option).
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Added the `backup interface` option.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

If an IP address or VRRP group is assigned to the interface, you cannot use the `switchport` command on the interface. To use the `switchport` command on an interface, only the `no ip address` and `no shutdown statements` must be listed in the `show config` output.

When you enter the `switchport` command, the interface is automatically added to the default VLAN.

To use the `switchport backup interface` command on a port, first enter the `switchport` command. For more information, refer to the "Configuring Redundant Links" section in the "Layer 2" chapter of the *Dell Networking OS Configuration Guide*.

Related Commands

interface port-channel — creates a port channel interface.

show interfaces switchport — displays information about switchport interfaces.

Port Channel Commands

A Link Aggregation Group (LAG) is a group of links that appear to a MAC client as if they were a single link according to IEEE 802.3ad. In Dell Networking OS, a LAG is referred to as a Port Channel.

- For the S-Series, the maximum port channel ID is 128 and the maximum members per port channel is 8.

Because each port can be assigned to only one Port Channel, and each Port Channel must have at least one port, some of those nominally available Port Channels might have no function because they could have no members if there are not enough ports installed. In the S-Series, stack members can provide those ports.

NOTE: The Dell Networking OS implementation of LAG or Port Channel requires that you configure a LAG on both switches manually. For information about Dell Networking OS link aggregation control protocol (LACP) for dynamic LAGs, refer to the Link Aggregation Control Protocol (LACP) chapter. For more information about configuring and using Port Channels, refer to the *Dell Networking OS Configuration Guide*.

channel-member

Add an interface to the Port Channel, while in INTERFACE PORTCHANNEL mode.

S6000

Syntax

`channel-member *interface*`

To delete an interface from a Port Channel, use the `no channel-member interface` command.

Parameters	*interface*	(OPTIONAL) Enter any of the following keywords and slot/ port or number information: • For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

Not configured.

Command Modes

INTERFACE PORTCHANNEL

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

Use the `interface port-channel` command to access this command.

You cannot add an interface to a Port Channel if the interface contains an IP address in its configuration. Only the `shutdown`, `description`, `mtu`, and `ip mtu` commands can be configured on an interface if it is added to a Port Channel. The `mtu` and `ip mtu` commands are only available when the chassis is in Jumbo mode.

Link MTU and IP MTU considerations for Port Channels are:

- All members must have the same link MTU value and the same IP MTU value.
- The Port Channel link MTU and IP MTU must be less than or equal to the link MTU and IP MTU values configured on the channel members. For example, if

the members have a link MTU of 2100 and an IP MTU 2000, the Port Channel's MTU values cannot be higher than 2100 for link MTU or 2000 bytes for IP MTU.

When an interface is removed from a Port Channel with the `no channel-member` command, the interface reverts to its configuration prior to joining the Port Channel.

An interface can belong to only one Port Channel.

On the E-Series TeraScale, you can add up to 16 interfaces to a Port Channel; E-Series ExaScale can add up to 64. You can have eight interfaces per Port Channel on the C-Series and S-Series. The interfaces can be located on different line cards but must be the same physical type and speed (for example, all 1-Gigabit Ethernet interfaces). However, you can combine 100/1000 interfaces and GE interfaces in the same Port Channel.

If the Port Channel contains a mix of interfaces with 100 Mb/s speed and 1000 Mb/s speed, the software disables those interfaces whose speed does not match the speed of the first interface configured and enabled in the Port Channel. If that first interface goes down, the Port Channel does not change its designated speed; disable and re-enable the Port Channel or change the order of the channel members configuration to change the designated speed. If the Port Channel contains a mix of interfaces with 100 Mb/s speed and 1000 Mb/s speed, the software disables those interfaces whose speed does not match the speed of the first interface configured and enabled in the Port Channel. If that first interface goes down, the Port Channel does not change its designated speed; disable and re-enable the Port Channel or change the order of the channel members configuration to change the designated speed. For more information about Port Channels, refer to the *Dell Networking OS Configuration Guide*.

Related Commands

description — assigns a descriptive text string to the interface.

interface port-channel — creates a Port Channel interface.

shutdown — disables/enables the port channel.

group

Group two LAGs in a supergroup (“fate-sharing group” or “failover group”).

S6000

Syntax

`group group_number port-channel number port-channel number`

To remove an existing LAG supergroup, use the `no group group_number` command.

Parameters

group_number	Enter an integer from 1 to 32 that uniquely identifies this LAG fate-sharing group.

port-channel *number*	Enter the keywords `port-channel` then an existing LAG number. Enter this keyword/variable combination twice, identifying the two paired LAGs.

Defaults none

Command Modes PORT-CHANNEL FAILOVER-GROUP (conf-po-failover-grp)

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the C-Series, E-Series, and S-Series.

Related Commands port-channel failover-group — accesses PORT-CHANNEL FAILOVER-GROUP mode to configure a LAG failover group.

show interfaces port-channel — displays information on configured Port Channel groups.

interface port-channel

Create a Port Channel interface, which is a link aggregation group (LAG) containing eight physical interfaces on the S-Series.

S6000

Syntax `interface port-channel` *`channel-number`*

To delete a Port Channel, use the `no interface port-channel` *`channel-number`* command.

Parameters

channel-number	For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on S4810.
Version 8.3.11.1	Introduced on Z9000.
Version 8.1.1.0	Introduced on E-Series ExaScale.
Version 7.6.1.0	Introduced on S-Series.
Version 7.5.1.0	Introduced on C-Series.
pre-Version 6.2.1.0	Introduced on E-Series.

Usage Information

Port Channel interfaces are logical interfaces and can be either in Layer 2 mode (by using the `switchport` command) or Layer 3 mode (by configuring an IP address). You can add a Port Channel in Layer 2 mode to a VLAN.

The `shutdown`, `description`, and `name` commands are the only commands that you can configure on an interface while it is a member of a Port Channel. To add a physical interface to a Port Channel, the interface can only have the `shutdown`, `description`, and `name` commands configured. The Port Channel's configuration is applied to the interfaces within the Port Channel.

A Port Channel can contain both 100/1000 interfaces and GE interfaces. Based on the first interface configured in the Port Channel and enabled, Dell Networking OS determines if the Port Channel uses 100 Mb/s or 1000 Mb/s as the common speed. For more information, refer to channel-member.

If the line card is in a Jumbo mode chassis, you can also configure the `mtu` and `ip mtu` commands. The Link MTU and IP MTU values configured on the channel members must be greater than the Link MTU and IP MTU values configured on the Port Channel interface.

If the stack—unit card is in a Jumbo mode chassis, you can also configure the `mtu` and `ip mtu` commands. The Link MTU and IP MTU values configured on the channel members must be greater than the Link MTU and IP MTU values configured on the Port Channel interface.

NOTE: In a Jumbo-enabled system, all members of a Port Channel must be configured with the same link MTU values and the same IP MTU values.

Example

```
Dell(conf)#int port-channel 2
Dell(conf-if-po-2)#
```

Related Commands

channel-member — adds a physical interface to the LAG.

interface — configures a physical interface.

interface loopback — configures a Loopback interface.

interface null — configures a null interface.

interface vlan — configures a VLAN.

shutdown — disables/enables the port channel.

minimum-links

Configure the minimum number of links in a LAG (Port Channel) that must be in “oper up” status for the LAG to be also in “oper up” status.

S6000

Syntax

```
minimum-links number
```

Parameters

number	Enter the number of links in a LAG that must be in “oper up” status. The range is from 1 to 16. The default is **1**.
number	Enter the number of links in a LAG that must be in “oper up” status. The range is from 1 to 8. The default is **1**.

Defaults **1**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

If you use this command to configure the minimum number of links in a LAG that must be in “oper up” status, the LAG must have at least that number of “oper up” links before it can be declared as up. For example, if the required minimum is four, and only three are up, the LAG is considered down.

port-channel failover-group

To configure a LAG failover group, access PORT-CHANNEL FAILOVER-GROUP mode.

S6000

Syntax

`port-channel failover-group`

To remove all LAG failover groups, use the `no port-channel failover-group` command.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.

Usage Information

This feature groups two LAGs to work in tandem as a supergroup. For example, if one LAG goes down, the other LAG is taken down automatically, providing an alternate path to reroute traffic, avoiding oversubscription on the other LAG. You can use both static and dynamic (LACP) LAGs to configure failover groups. For more information, refer to the “Port Channel” chapter in the *Dell Networking OS Configuration Guide*.

Related Command

group — groups two LAGs in a supergroup (“fate-sharing group”).

show interfaces port-channel — displays information on configured Port Channel groups.

show interfaces port-channel

Display information on configured Port Channel groups.

S6000

Syntax	`show interfaces port-channel [*channel-number*] [brief]`

Parameters

channel-number	For a Port Channel interface, enter the keyword `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128.
brief	(OPTIONAL) Enter the keyword `brief` to display only the port channel number, the state of the port channel, and the number of interfaces in the port channel.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series. Modified to display the LAG failover group status.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The following describes the `show interfaces port-channel` command shown in the following example.

Field	Description
Port-Channel 1...	Displays the LAG's status. In the Example, the status of the LAG's LAG fate-sharing group ("Failover-group") is listed.

Field	Description
Hardware is…	Displays the interface's hardware information and its assigned MAC address.
Port-channel is part…	Indicates whether the LAG is part of a LAG fate-sharing group ("Failover-group").
Internet address…	States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.
MTU 1554…	Displays link and IP MTU.
LineSpeed	Displays the interface's line speed. For a port channel interface, it is the line speed of the interfaces in the port channel.
Members in this…	Displays the interfaces belonging to this port channel.
ARP type:…	Displays the ARP type and the ARP timeout value for the interface.
Last clearing…	Displays the time when the `show interfaces` counters were cleared.
Queueing strategy.	States the packet queuing strategy. FIFO means first in first out.
packets input…	Displays the number of packets and bytes into the interface.
Input 0 IP packets…	Displays the number of packets with IP headers, VLAN tagged headers, and MPLS headers. The number of packets may not add correctly because a VLAN tagged IP packet counts as both a VLAN packet and an IP packet.
0 64-byte…	Displays the size of packets and the number of those packets entering that interface. This information is displayed over two lines.
Received 0…	Displays the type and number of errors or other specific packets received. This information is displayed over three lines.
Output 0…	Displays the type and number of packets sent out the interface. This information is displayed over three lines.
Rate information…	Displays the traffic rate information into and out of the interface. Traffic rate is displayed in bits and packets per second.
Time since…	Displays the time since the last change in the configuration of this interface.

Example

```
Dell#show interfaces port-channel 20
Port-channel 20 is up, line protocol is up (Failover-group 1
is down)
Hardware address is 00:01:e8:01:46:fa
Port-channel is part of failover-group 1
Internet address is 1.1.120.1/24
MTU 1554 bytes, IP MTU 1500 bytes
```

```
LineSpeed 2000 Mbit
Members in this channel: Gi 0/5 Gi 0/18
ARP type: ARPA, ARP timeout 04:00:00
Last clearing of "show interfaces" counters 00:00:00
Queueing strategy: fifo
  44507301 packets input, 3563070343 bytes
  Input 44506754 IP Packets, 0 Vlans 0 MPLS
  41 64-byte pkts, 44502871 over 64-byte pkts, 249 over 127-
byte pkts
  407 over 255-byte pkts, 3127 over 511-byte pkts, 606 over
1023-byte pkts
  Received 0 input symbol errors, 0 runts, 0 giants, 0
throttles
  0 CRC, 0 IP Checksum, 0 overrun, 0 discarded
  1218120 packets output, 100745130 bytes, 0 underruns
  Output 5428 Multicasts, 4 Broadcasts, 1212688 Unicasts
  1216142 IP Packets, 0 Vlans, 0 MPLS
  0 throttles, 0 discarded
Rate info (interval 299 sec):
  Input 01.50Mbits/sec, 2433 packets/sec
  Output 00.02Mbits/sec,4 packets/sec
Time since last interface status change: 00:22:34

Dell#
```

User Information

The following describes the `show interfaces port-channel brief` command shown in the following example.

Field	Description
LAG	Lists the port channel number.
Mode	Lists the mode: • L3 — for Layer 3 • L2 — for Layer 2
Status	Displays the status of the port channel. • down — if the port channel is disabled (`shutdown`) • up — if the port channel is enabled (`no shutdown`)
Uptime	Displays the age of the port channel in hours:minutes:seconds.
Ports	Lists the interfaces assigned to this port channel.
(untitled)	Displays the status of the physical interfaces (up or down). • In Layer 2 port channels, an * (asterisk) indicates which interface is the primary port of the port channel. The primary port sends out interface PDU. • In Layer 3 port channels, the primary port is not indicated.

Example

```
Dell#sh int por 1 br

LAG Mode Status Uptime    Ports
1   L2   up     00:00:08  Gi 3/0  (Up) *
```

```
                                Gi 3/1 (Down)
                                Gi 3/2 (Up)
Dell#
```

Related Commands

show lacp — displays the LACP matrix.

show port-channel-flow

Display an egress port in a given port-channel flow.

S6000

Syntax

```
show port-channel-flow outgoing-port-channel number incoming-
interface interface {source-ip address destination-ip address}
| {source-port number destination-port number} | {source-mac
address destination-mac address {vlan vlanid | ether-type}}
```

Parameters

outgoing-port-channel *number*	Enter the keywords `outgoing-port-channel` then the number of the port channel to display flow information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
incoming-interface *interface*	Enter the keywords `incoming-interface` then the interface type and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
source-ip *address*	Enter the keywords `source-ip` then the IP source address in IP address format.
destination-ip *address*	Enter the keywords `destination-ip` then the IP destination address in IP address format.
source-port *number*	Enter the keywords `source-port` then the source port number. The range is from 1 to 65536. The default is **None**.
destination-port *number*	Enter the keywords `destination-port` then the destination port number. The range is from 1 to 65536. The default is **None**.
source-mac *address*	Enter the keywords `source-mac` then the MAC source address in the nn:nn:nn:nn:nn:nn format.
destination-mac *address*	Enter the keywords `destination-mac` then the MAC destination address in the nn:nn:nn:nn:nn:nn format.
vlan ***vlan-id***	Enter the keywords `vlan` then the VLAN-id. The range is from 0 to 4094.
ether-type	Enter the keywords `ether-type` in the XX:XX format.

Command Modes	EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.0	Introduced on the S4810.

Usage Information

Because this command calculates based on a Layer 2 hash algorithm, use this command to display flows for switched Layer 2 packets, not for routed packets (use the `show ip flow` command to display routed packets).

The `show port-channel-flow` command returns the egress port identification in a given port-channel if a valid flow is entered. A mismatched flow error occurs if MAC-based hashing is configured for a Layer 2 interface and you are trying to display a Layer 3 flow.

The output displays three entries:

- Egress port for unfragmented packets.
- In the event of fragmented packets, the egress port of the first fragment.
- In the event of fragmented packets, the egress port of the subsequent fragments.

NOTE: In the `show port channel flow` command output, the egress port for an unknown unicast, multicast, or broadcast traffic is not displayed.

The following example shows the `show port-channel-flow outgoing-port-channel` *`number`* `incoming-interface` *`interface`* `source-mac` *`address`* `destination-mac` *`address`*

- Load-balance is configured for MAC
- Load-balance is configured for IP 4-tuple/2-tuple
- A non-IP payload is going out of Layer 2 LAG interface that is a member of VLAN with an IP address

Example

```
Dell#show port-channel-flow outgoing-port-channel 1 incoming-
interface gi 3/0
source-mac 00:00:50:00:00:00 destination-mac 00:00:a0:00:00:00

    Egress Port for port-channel 1, for the given flow, is Te
13/01
```

Enhanced Validation of Interface Ranges

This functionality is supported on the S6000 platform.

You can avoid specifying spaces between the range of interfaces, separated by commas, that you configure by using the `interface range` command. For example, if you enter a list of interface ranges, such as `interface range fo 2/0-1,te 10/0,gi 3/0,fa 0/0`, this configuration is considered valid. The comma-separated list is not required to be separated by spaces in between the ranges. You can associate multicast MAC or hardware addresses to an interface range and VLANs by using the `mac-address-table static` `*multicast-mac-address*` `vlan` `*vlan-id*` `output-range` `*interface*` command.

ip http source-interface

Specify an interface as the source interface for HTTP connections.

This feature is supported on S6000 platform.

Syntax **ip http source-interface** *`interface`*

To delete an interface, use the**no ip http source-interface** *`interface`* command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a 40-Gigabit Ethernet interface, enter the keyword **fortyGigE** followed by the slot/port information. • For a 1-Gigabit Ethernet interface, enter the keyword **GigabitEthernet** followed by the slot/port information. • For Loopback interfaces, enter the keyword **loopback** followed by a number from zero (0) to 16383. • For a Port Channel interface, enter the keyword **port-channel** followed by a number: – S-Series: 1-128 • For a 10-Gigabit Ethernet interface, enter the keyword **TenGigabitEthernet** followed by the slot/port information. • For a VLAN interface, enter the keyword **vlan** followed by a number from 1 to 4094.

Defaults The IP address on the system that is closest to the Telnet address is used in the outgoing packets.

Command Modes CONFIGURATION

Command History		
	Version 9.3(0.1)	Introduced on the S4810, S4820T, S6000, and Z9000.
	Version 8.3.11.1	Introduced on the Z9000
	Version 8.2.1.0	Increased number of VLANs on ExaScale to 4094 (was 2094)
	Version 8.1.1.0	Introduced on E-Series ExaScale
	Version 7.6.1.0	Support added for S-Series
	Version 7.5.1.0	Introduced on C-Series

Related Commands	
	`ip ftp source interface` Configuring source interface for ftp communications.

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IPv4 Routing

The basic IPv4 commands are supported by Dell Networking operating system on the S6000 platform.

arp

To associate an IP address with a MAC address in the switch, use address resolution protocol (ARP).

S6000

Syntax	`arp [vrf vrf-name] ip-address mac-address interface` To remove an ARP address, use the `no arp ip-address` command.
Parameters	

vrf *vrf-name*	Enter a VRF name to configure an ARP entry for that VRF. Use the VRF option after the keyword `arp` to configure a static arp on that particular VRF.
ip-address	Enter an IP address in dotted decimal format.
mac-address	Enter a MAC address in nnnn.nnnn.nnnn format.
interface	(OPTIONAL) Enter any of the following keywords and slot/port or number information: • For the Management interface, enter the keyword `ManagementEthernet` then the slot/port information. The slot range is from 0 to 1 and the port range is 0. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

You cannot use Class D or Class E IP addresses or zero IP address (0.0.0.0) when creating a static ARP. Zero MAC addresses (00:00:00:00:00:00) are also invalid.

You can use the `vrf` attribute of this command to create a static ARP entry on either a default or a non-default VRF. You cannot use this parameter to create any static ARPs corresponding to management VRFs. When a VRF is deleted using the `no ip vrf` command, all the static ARP configurations that belong to that VRF are removed automatically.

Related Commands

clear arp-cache — clears dynamic ARP entries from the ARP table.

show arp — displays the ARP table.

arp backoff-time

Set the exponential timer for resending unresolved ARPs.

S6000

Syntax `arp backoff-time seconds`

Parameters

seconds	Enter the number of seconds an ARP entry is black-holed. The range is from 1 to 3600. The default is **30**.

Defaults **30**

Command Mode CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Usage Information

This timer is an exponential backoff timer. Over the specified period, the time between ARP requests increases. This behavior reduces the potential for the system to slow down while waiting for a multitude of ARP responses.

Related Commands

show arp retries — displays the configured number of ARP retries.

arp learn-enable

Enable ARP learning using gratuitous ARP.

S6000

Syntax

`arp learn-enable`

Defaults

Disabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced.

Usage Information

In Dell Networking OS versions prior to 8.3.1.0, if a gratuitous ARP is received some time after an ARP request is sent, only RP2 installs the ARP information. For example:

1. At time t=0, Dell Networking OS sends an ARP request for IP *A.B.C.D*.
2. At time t=1, Dell Networking OS receives an ARP request for IP *A.B.C.D*.
3. At time t=2, Dell Networking OS installs an ARP entry for *A.B.C.D* only on RP2.

Beginning with Dell Networking OS version 8.3.1.0, when a gratuitous ARP is received, Dell Networking OS installs an ARP entry on all three CPUs.

arp max-entries

Enables you to configure the maximum number of ARP entries per VRF that are allowed for IPv4..

Syntax

```
arp max-entries [vrf vrf-name] max-number
```

Parameters

vrf *vrf-name*	Enter the name of a specific VRF for which you want to configure maximum number of ARP entries that IPv4 allows.
max-number	Enter the maximum number of ARP entries that a VRF RTM can hold. The range is from 0 to 65535.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S4810 and S4820T.

Usage Information

Use this command to specify the maximum number of ARP entries that the Route Table Manager can hold for a specific VRF. This command does not apply to the management VRFs.

arp retries

Set the number of ARP retries in case the system does not receive an ARP reply in response to an ARP request.

S6000

Syntax	`arp retries number`
Parameters	*number* — Enter the number of retries. The range is from 1 to 20. The default is **5**.
Defaults	**5**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced.

Usage Information	Retries are 20 seconds apart.
Related Commands	show arp retries — displays the configured number of ARP retries.

arp timeout

Set the time interval for an ARP entry to remain in the ARP cache.

S6000

Syntax	`arp timeout minutes`
Parameters	*minutes* — Enter the number of minutes. The range is from 0 to 35790. The default is **240 minutes**.

Defaults	**240 minutes** (4 hours)
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands	show interfaces — displays the ARP timeout value for all available interfaces.

clear arp-cache

Clear the dynamic ARP entries from a specific interface or optionally delete (`no-refresh`) ARP entries from the content addressable memory (CAM).

S6000

Syntax

```
clear arp-cache [vrf vrf-name | interface | ip ip-address] [no-refresh]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to clear the ARP cache corresponding to that VRF.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For the Management interface, enter the keyword `ManagementEthernet` then the slot/port information. The slot range is from 0 to 1 and the port range is 0. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

ip *ip-address*	(OPTIONAL) Enter the keyword `ip` then the IP address of the ARP entry you wish to clear.
no-refresh	(OPTIONAL) Enter the keywords `no-refresh` to delete the ARP entry from CAM. Or use this option with `interface` or `ip ip-address` to specify which dynamic ARP entries you want to delete. NOTE: Transit traffic may not be forwarded during the period when deleted ARP entries are resolved again and re-installed in CAM. Use this option with extreme caution.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4094 VLANs on the E-Series ExaScale (the prior limit was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.9.1.0	Introduced VRF on the E-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

clear host

Remove one or all dynamically learned host table entries.

S6000

Syntax `clear host name`

Parameters

name	Enter the name of the host to delete. Enter `*` to delete all host table entries.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

clear ip fib stack-unit

Clear all FIB entries in the specified stack unit (use this command with caution, refer to *Usage Information*.)

S6000

Syntax `clear ip fib stack-unit unit-number vrf vrf-name`

Parameters

unit-number	Enter the number of the stack unit. The range is from 0 to 11.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to clear all FIB entries corresponding to that VRF.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.19.0	Introduced on the S4820T.

Usage Information

To clear Layer 3 CAM inconsistencies, use this command.

△ **CAUTION: Executing this command causes traffic disruption.**

Related Commands

show ip fib stack-unit — shows FIB entries on a specified stack-unit.

clear ip route

Clear one or all routes in the routing table.

S6000

Syntax

```
clear ip route [vrf vrf-name] {* | ip-address mask}
```

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF to clear the routes corresponding to that VRF.
*	Enter an asterisk (*) to clear all learned IP routes.
ip-address mask	Enter a specific IP address and mask in dotted decimal format to clear that IP address from the routing table.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.9.1.0	Introduced VRF on the E-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Use the `vrf` *`vrf-name`* attribute of this command to clear routes corresponding to either a specific VRF or the default VRF.

You cannot use this attribute to clear routes corresponding to a management VRF.

Related Commands

ip route — assigns an IP route to the switch.

show ip route — views the routing table.

show ip route summary — views a summary of the routing table.

clear tcp statistics

Clear TCP counters.

S6000

Syntax `clear tcp statistics [all | cp | rp1 | rp2]`

Parameters

all	Enter the keyword `all` to clear all TCP statistics maintained on all switch processors.
cp	(OPTIONAL) Enter the `cp` to clear only statistics from the Control Processor.
rp1	(OPTIONAL) Enter the keyword `rp1` to clear only the statistics from Route Processor 1.
rp2	(OPTIONAL) Enter the keyword `rp2` to clear only the statistics from Route Processor 2.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

debug arp

View information on ARP transactions.

S6000

Syntax

`debug arp [interface] [count value]`

To stop debugging ARP transactions, use the `no debug arp` command.

Parameters

interface (OPTIONAL) Enter the following keywords and slot/port or number information:

- For a 1-Gigabit Ethernet interface, enter the keyword `Gigabitethernet` then the slot/port information.
- For the Management interface, enter the keyword `ManagementEthernet` then the slot/port information. The slot range is from 0 to 1 and the port range is 0.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

count *value*	(OPTIONAL) Enter the keyword `count` then the count value. The range is from 1 to 65534.

Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4094 VLANs on the E-Series ExaScale (the prior limit was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Added the `count` option.

Usage Information	To stop packets from flooding the user terminal when debugging is turned on, use the `count` option.

debug ip dhcp

Enable debug information for dynamic host configuration protocol (DHCP) relay transactions and display the information on the console.

S6000

Syntax	`debug ip dhcp` To disable debug, use the `no debug ip dhcp` command.
Defaults	Debug disabled
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.10	Introduced on the E-Series.

Example

```
Dell#debug ip dhcp
00:12:21 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received
at interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xbf05140f, secs = 0, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:21 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:26 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received
at interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xbf05140f, secs = 5, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:26 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:40 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received
at interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:40 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:42 : %RELAY-I-PACKET: BOOTP REPLY (Unicast) received at
interface 14.4.4.1 BOOTP Reply,
hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:
8C, giaddr = 113.3.3.17
00:12:42 : %RELAY-I-BOOTREPLY: Forwarded BOOTREPLY for
00:60:CF:20:7B:8C to 113.3.3.254
00:12:42 : %RELAY-I-PACKET: BOOTP REQUEST (Unicast) received
at interface 113.3.3.17 BOOTP
Request, hops = 0, XID = 0xda4f9503, secs = 0, hwaddr =
00:60:CF:20:7B:8C, giaddr = 0.0.0.0
00:12:42 : %RELAY-I-BOOTREQUEST: Forwarded BOOTREQUEST for
00:60:CF:20:7B:8C to 14.4.4.2
00:12:42 : %RELAY-I-PACKET: BOOTP REPLY (Unicast) received at
interface 14.4.4.1 BOOTP Reply,
hops = 0, XID = 0xda4f9503, secs = 0, hwaddr = 00:60:CF:20:7B:
8C, giaddr = 113.3.3.17
00:12:42 : %RELAY-I-BOOTREPLY: Forwarded BOOTREPLY for
```

```
00:60:CF:20:7B:8C to 113.3.3.254
Dell#
```

Related Commands

ip helper-address – specifies the destination broadcast or host address for the DHCP server request.

ip helper-address hop-count disable – disables the hop-count increment for the DHCP relay agent.

debug ip icmp

View information on the internal control message protocol (ICMP).

S6000

Syntax

`debug ip icmp [interface] [count value]`

To disable debugging, use the `no debug ip icmp` command.

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For the Management interface, enter the keyword `ManagementEthernet` then the slot/port information. The slot range is from 0 to 1 and the port range is 0. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a Tunnel interface, enter the keywords `tunnel` then a number. The range is from 1 to 16383. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.
count *value*	(OPTIONAL) Enter the keyword `count` then the count value. The range is from 1 to 65534. The default is **Infinity**.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4094 VLANs on the E-Series ExaScale (the prior limit was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Added the `count` option.

Example

```
ICMP: echo request rcvd from src 40.40.40.40
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: echo request sent to dst 40.40.40.40
ICMP: echo request rcvd from src 40.40.40.40
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: src 40.40.40.40, dst 40.40.40.40, echo reply
ICMP: echo request sent to dst 40.40.40.40
```

Usage Information

To stop packets from flooding the user terminal when debugging is turned on, use the `count` option.

debug ip packet

View a log of IP packets sent and received.

S6000

Syntax

`debug ip packet [access-group` *`name`*`] [count` *`value`*`] [`*`interface`*`]`

To disable debugging, use the `no debug ip packet [access-group` *`name`*`] [count` *`value`*`] [`*`interface`*`]` command.

Parameters

access-group *name*	Enter the keyword `access-group` then the access list name (maximum 16 characters) to limit the debug output based on the defined rules in the ACL.
count *value*	(OPTIONAL) Enter the keyword `count` then the count value. The range is from 1 to 65534. The default is `Infinity`.

interface (OPTIONAL) Enter the following keywords and slot/port or number information:

- For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
- For the Management interface, enter the keyword `ManagementEthernet` then the slot/port information. The slot range is from 0 to 1 and the port range is 0.
- For a Port Channel interface, enter the keywords `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128.
- For a SONET interface, enter the keyword `sonet` then the slot/port information.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4094 VLANs on the E-Series ExaScale (the prior limit was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Added the `access-group` option.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Added the `count` option.

Usage Information The following describes the `debug ip packet` command in the following example.

Field	Description
s=	Lists the source address of the packet and the name of the interface (in parentheses) that received the packet.
d=	Lists the destination address of the packet and the name of the interface (in parentheses) through which the packet is being sent out on the network.
len	Displays the packet's length.
sending, rcvd, fragment, sending broad/multicast proto, unroutable	The last part of each line lists the status of the packet.
TCP src=	Displays the source and destination ports, the sequence number, the acknowledgement number, and the window size of the packets in that TCP packets.
UDP src=	Displays the source and destination ports for the UDP packets.
ICMP type=	Displays the ICMP type and code.
IP Fragment	States that it is a fragment and displays the unique number identifying the fragment (Ident) and the offset (in 8-byte units) of this fragment (fragment offset) from the beginning of the original datagram.

Example

```
IP: s=10.1.2.62 (local), d=10.1.2.206 (Ma 0/0), len 54, sending
    TCP src=23, dst=40869, seq=2112994894, ack=606901739,
win=8191 ACK PUSH
IP: s=10.1.2.206 (Ma 0/0), d=10.1.2.62, len 40, rcvd
    TCP src=0, dst=0, seq=0, ack=0, win=0
IP: s=10.1.2.62 (local), d=10.1.2.206 (Ma 0/0), len 226,
sending
    TCP src=23, dst=40869, seq=2112994896, ack=606901739,
win=8192 ACK PUSH
IP: s=10.1.2.216 (Ma 0/0), d=10.1.2.255, len 78, rcvd
    UDP src=0, dst=0
IP: s=10.1.2.62 (local), d=10.1.2.3 (Ma 0/0), len 1500,
sending fragment
    IP Fragment, Ident = 4741, fragment offset = 0
    ICMP type=0, code=0
IP: s=10.1.2.62 (local), d=10.1.2.3 (Ma 0/0), len 1500,
sending fragment
    IP Fragment, Ident = 4741, fragment offset = 1480
IP: s=40.40.40.40 (local), d=224.0.0.5 (Gi 4/11), len 64,
sending broad/multicast
proto=89
IP: s=40.40.40.40 (local), d=224.0.0.6 (Gi 4/11), len 28,
sending broad/multicast
proto=2
IP: s=0.0.0.0, d=30.30.30.30, len 100, unroutable
   ICMP type=8, code=0
IP: s=0.0.0.0, d=30.30.30.30, len 100, unroutable
   ICMP type=8, code=0
```

Usage Information

To stop packets from flooding the user terminal when debugging is turned on, use the `count` option.

The `access-group` option supports only the equal to (`eq`) operator in TCP ACL rules. Port operators not equal to (`neq`), greater than (`gt`), less than (`lt`), or `range` are not supported in access-group option (refer to the following example). ARP packets (`arp`) and Ether-type (`ether-type`) are also not supported in the `access-group` option. The entire rule is skipped to compose the filter.

The `access-group` option pertains to:

- IP protocol number: from 0 to 255
- Internet control message protocol (`icmp`) but not the ICMP message type (from 0 to 255)
- Any internet protocol (`ip`)
- Transmission Control Protocol (`tcp`) but not on the `rst`, `syn`, or `urg` bits
- User Datagram Protocol (`udp`)

In the case of ambiguous access control list rules, the `debug ip packet access-control` command is disabled. A message appears identifying the error (refer to the Example below).

Example (Error Messages)

```
Dell#debug ip packet access-group test
%Error: port operator GT not supported in access-list debug
%Error: port operator LT not supported in access-list debug
%Error: port operator RANGE not supported in access-list debug
%Error: port operator NEQ not supported in access-list debug

Dell#00:10:45: %RPM0-P:CP
%IPMGR-3-DEBUG_IP_PACKET_ACL_AMBIGUOUS_EXP: Ambiguous rules not
supported in access-list debug, access-list debugging is
turned off
Dell#
```

ip address

Assign a primary and secondary IP address to the interface.

S6000

Syntax

`ip address` *`ip-address mask`* `[secondary]`

To delete an IP address from an interface, use the `no ip address [`*`ip-address`*`]` command.

Parameters

ip-address	Enter an IP address in dotted decimal format.
mask	Enter the mask of the IP address in slash prefix format (for example, /24).

secondary	(OPTIONAL) Enter the keyword `secondary` to designate the IP address as the secondary address.

Defaults	Not configured.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Usage Information	You must be in INTERFACE mode before you add an IP address to an interface. Assign an IP address to an interface prior to entering ROUTER OSPF mode.

ip directed-broadcast

Enables the interface to receive directed broadcast packets.

S6000

Syntax	`ip directed-broadcast` To disable the interface from receiving directed broadcast packets, use the `no ip directed-broadcast` command.
Defaults	Disabled (that is, the interface does not receive directed broadcast packets)
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

ip domain-list

Configure names to complete unqualified host names.

S6000

Syntax

`ip domain-list name`

To remove the name, use the `no ip domain-list name` command.

Parameters

name	Enter a domain name to be used to complete unqualified names (that is, incomplete domain names that cannot be resolved).

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Usage Information	To configure a list of possible domain names, configure the `ip domain-list` command up to six times. If you configure both the `ip domain-name` and `ip domain-list` commands, the software tries to resolve the name using the `ip domain-name` command. If the name is not resolved, the software goes through the list of names configured with the `ip domain-list` command to find a match. To enable dynamic resolution of hosts, use the following steps: • specify a domain name server with the `ip name-server` command • enable DNS with the `ip domain-lookup` command To view current bindings, use the `show hosts` command. To view a DNS-related configuration, use the `show running-config resolve` command.
Related Commands	ip domain-name — specifies a DNS server.

ip domain-lookup

To address resolution (that is, DNS), enable dynamic host-name.

S6000

Syntax	`ip domain-lookup` To disable DNS lookup, use the `no ip domain-lookup` command.
Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.

Usage Information

To fully enable DNS, also specify one or more domain name servers with the `ip name-server` command.

Dell Networking OS does not support sending DNS queries over a VLAN. DNS queries are sent out all other interfaces, including the Management port.

To view current bindings, use the `show hosts` command.

Related Commands

ip name-server — specifies a DNS server.

show hosts — Views the current bindings.

ip domain-name

Configure one domain name for the switch.

S6000

Syntax

`ip domain-name name`

To remove the domain name, use the `no ip domain-name` command.

Parameters

name	Enter one domain name to be used to complete unqualified names (that is, incomplete domain names that cannot be resolved).

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Usage Information

You can only configure one domain name with the `ip domain-name` command. To configure more than one domain name, configure the `ip domain-list` command up to six times.

To enable dynamic resolution of hosts, use the following steps:

- specify a domain name server with the `ip name-server` command
- enable DNS with the `ip domain-lookup` command

To view current bindings, use the `show hosts` command.

Related Commands

ip domain-list — configures additional names.

ip helper-address

Specify the address of a DHCP server so that DHCP broadcast messages can be forwarded when the DHCP server is not on the same subnet as the client.

S6000

Syntax

`ip helper-address ip-address`

To remove a DHCP server address, use the `no ip helper-address` command.

Parameters

ip-address	Enter an IP address in dotted decimal format (A.B.C.D).

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Added support for IPv6.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.9.1.0	Introduced VRF on the E-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

You can add multiple DHCP servers by entering the `ip helper-address` command multiple times. If multiple servers are defined, an incoming request is sent simultaneously to all configured servers and the reply is forwarded to the DHCP client.

Dell Networking OS uses standard DHCP ports, that is UDP ports 67 (server) and 68 (client) for DHCP relay services. It listens on port 67 and if it receives a broadcast, the software converts it to unicast, and forwards to it to the DHCP-server with source port=68 and destination port=67.

The server replies with source port=67, destination port=67 and Dell Networking OS forwards to the client with source port=67, destination port=68.

ip helper-address hop-count disable

Disable the hop-count increment for the DHCP relay agent.

S6000

Syntax

```
ip helper-address hop-count disable
```

To re-enable the hop-count increment, use the `no ip helper-address hop-count disable` command.

Defaults

Enabled; the hops field in the DHCP message header is incremented by default.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced for the E-Series.

Usage Information

This command disables the incrementing of the hops field when boot requests are relayed to a DHCP server through Dell Networking OS. If the incoming boot request already has a non-zero hops field, the message is relayed with the same value for hops. However, the message is discarded if the hops field exceeds 16, to comply with the relay agent behavior specified in RFC 1542.

Related Commands

ip helper-address — specifies the destination broadcast or host address for DHCP server requests.

show running-config — displays the current configuration and changes from the default values.

ip host

Assign a name and IP address the host-to-IP address mapping table uses.

S6000

Syntax

`ip host name ip-address`

To remove an IP host, use the `no ip host name [ip-address]` command.

Parameters

name	Enter a text string to associate with one IP address.
ip address	Enter an IP address, in dotted decimal format, to be mapped to the name.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced for the E-Series.

ip icmp source-interface

Enable the ICMP error and unreachable messages to be sent with the source interface IP address, such as the loopback address, instead of the hops of the preceding devices along the network path to be used for easy debugging and diagnosis of network disconnections and reachability problems with IPv4 packets. This functionality is supported on the , , S6000, and platforms.

Syntax `ip icmp source-interface` *`interface`*

Parameters

interface Enter one of the following keywords and slot/port or number information:

- For a Management Ethernet interface, enter the keyword `managementethernet`.

  NOTE: When you configure the capability to enable the loopback IP address to be sent for easy debugging and diagnosis (IP addresses of the devices for which the ICMP source interface is configured), the source IP address of the outgoing ICMP error message is modified, although the packets are not sent out using the configured interface. Because the management interface is configured without any parameters such as the IP address, it is treated to the management interface of the primary unit or the existing unit.
- For a Loopback interface, enter the keyword `loopback`. The range is from 0 to 16383.
- For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet`.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet`.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE`.
- For a VLAN interface, enter the keyword `vlan`. The range is from 1 to 4094.

Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	**Version 9.3(0.0)** Introduced on the S4810, S4820T, S6000, and Z9000 platforms.
Usage Information	You can enable the mechanism to configure the source or the originating interface from which the packet (the device that generates the ICMP error messages) is received by the switch to send the loopback address instead of its source IP address to be used in the ICMP unreachable messages and in the `traceroute` command output. The loopback address must be unique in a particular domain. In network environments that contain a large number of devices, ranging up to thousands of systems, and with each device configured for equal-cost multipath (ECMP) links, you cannot effectively and optimally use the traceroute and ping applications to examine the network reachablity and identify any broken links for diagnostic purposes. In such cases, if the reply that is obtained from each hop on the network path contains the IP address of the adjacent, neighboring interface from which the packet is received, it is difficult to employ the ping and traceroute utilites. You can enable the ICMP unreachable messages to contain the loopback address of the source device instead of the previous hop's IP address to be able to easily and quickly identify the device and devices along the path because the DNS server maps the loopback IP address to the hostname and does not translate the IP address of every interface of the switch to the hostname.

Example

```
Dell(conf)#ip icmp source-interface tengigabitethernet 0/0
Dell(conf)#
```

ipv6 icmp source-interface

Enable the ICMP error and unreachable messages to be sent with the source interface IP address, such as the loopback address, instead of the hops of the preceding devices along the network path to be used for easy debugging and diagnosis of network disconnections and reachability problems with IPv6 packets. This functionality is supported on the , , S6000, and platforms.

Syntax

`ipv6 icmp source-interface *interface*`

Parameters

interface	Enter one of the following keywords and slot/port or number information: • For a Management Ethernet interface, enter the keyword `managementethernet`.

NOTE: When you configure the capability to enable the loopback IP address to be sent for easy debugging and diagnosis (IP addresses of the devices for which the ICMP source interface is configured), the source IP address of the outgoing ICMP error message is modified, although the packets are not sent out using the configured interface. Because the management interface is configurable only without any parameters such as the IP address, it is treated to the management interface of the primary unit or the existing unit.

- For a Loopback interface, enter the keyword `loopback`. The range is from 0 to 16383.
- For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet`.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet`.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE`.
- For a VLAN interface, enter the keyword `vlan`. The range is from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

Version 9.3(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information

You can enable the mechanism to configure the source or the originating interface from which the packet (the device that generates the ICMP error messages) is received by the switch to send the loopback address instead of its source IP address to be used in the ICMP unreachable messages and in the `traceroute` command output. The loopback address must be unique in a particular domain.

In network environments that contain a large number of devices, ranging up to thousands of systems, and with each device configured for equal-cost multipath (ECMP) links, you cannot effectively and optimally use the traceroute and ping applications to examine the network reachablity and identify any broken links for diagnostic purposes. In such cases, if the reply that is obtained from each hop on the network path contains the IP address of the adjacent, neighboring interface from which the packet is received, it is difficult to employ the ping and traceroute utilites. You can enable the ICMP unreachable messages to contain the loopback address of the source device instead of the previous hop's IP address to be able to easily and quickly identify the device and devices along the path because the DNS server maps the loopback IP address to the hostname and does not translate the IP address of every interface of the switch to the hostname.

Example

```
Dell(conf)#ipv6 icmp source-interface tengigabitethernet 0/0
Dell(conf)#
```

ip max-frag-count

Set the maximum number of fragments allowed in one packet for packet re-assembly.

S6000

Syntax

`ip max-frag-count count`

To place no limit on the number of fragments allowed, use the `no ip max-frag-count` command.

Parameters

count	Enter a number for the number of fragments allowed for re-assembly. The range is from 2 to 256.

Defaults

No limit is set on number of fragments allowed.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced for the E-Series.

Usage Information

To avoid denial of service (DOS) attacks, keep the number of fragments allowed for re-assembly low.

ip name-server

Enter up to six IPv4 addresses of name servers. The order you enter the addresses determines the order of their use.

S6000

Syntax

`ip name-server` *`ipv4-address`* `[`*`ipv4-address2...ipv4-address6`*`]`

To remove a name server, use the `no ip name-server` *`ip-address`* command.

Parameters

ipv4-address	Enter the IPv4 address, in dotted decimal format, of the name server to be used.
ipv4-address2... ipv4-address6	(OPTIONAL) Enter up five more IPv4 addresses, in dotted decimal format, of name servers to be used. Separate the addresses with a space.

Defaults

No name servers are configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Dell Networking OS does not support sending DNS queries over a VLAN. DNS queries are sent out on all other interfaces, including the Management port.

You can separately configure both IPv4 and IPv6 domain name servers.

ip proxy-arp

Enable proxy ARP on an interface.

S6000

Syntax	`ip proxy-arp` To disable proxy ARP, use the `no ip proxy-arp` command.
Defaults	Enabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands	show ip interface — displays the interface routing status and configuration.

ip route

Assign a static route to the switch.

S6000

Syntax	`ip route [vrf` *`vrf-name`*`] ip-address mask {`*`ip-address`*` | interface [`*`ip-address`*`]} [`*`distance`*`] [permanent] [tag` *`tag-value`*`] [vrf` *`vrf-name`*`]` To delete a specific static route, use the `no ip route` *`destination mask`* command.

To delete all routes matching a certain route, use the `no ip route destination mask` command.

Parameters

vrf *vrf-name*	(Optoinal) Enter the keyword `vrf` and then the name of the VRF to configure a static route corresponding to that VRF. Use this VRF option after the `ip route` keyword to configure a static route on that particular VRF.
destination	Enter the IP address in dotted decimal format of the destination device.
mask	Enter the mask in the slash prefix format (/x) of the destination IP address.
ip-address	Enter the IP address of the forwarding router in dotted decimal format.
interface *ip-address*	Enter the keyword `interface` then the IP address.
distance	(OPTIONAL) Enter the value of the distance metric assigned to the route. The range is from 1 to 255.
permanent	(OPTIONAL) Enter the keyword `permanent` to specify that the route must not be removed even if the interface assigned to that route goes down. The route must be currently active to be installed in the routing table. If you disable the interface, the route is removed from the routing table.
tag *tag-value*	(OPTIONAL) Enter the keyword `tag` then a number to assign to the route. The range is from 1 to 4294967295.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF. Use this VRF option after the next hop to specify which VRF the next hop belongs to. This setting is used in route leaking cases. Refer to the Route Leaking VRFs section in the Virtual Routing and Forwarding (VRF) chapter of the Configuration guide.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.

Version 9.2.(0.0)	Added support for tunnel interface type.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4094 VLANs on the E-Series ExaScale (the prior limit was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.9.1.0	Introduced VRF on the E-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Using the following example of a static route: ip route 33.33.33.0 /24 tengigabitethernet 0/0 172.31.5.43

- The software installs a next hop that is not on the directly connected subnet but which recursively resolves to a next hop on the interface's configured subnet. In the example, if gig 0/0 has an ip address on subnet 2.2.2.0 and if 172.31.5.43 recursively resolves to 2.2.2.0, Dell Networking OS installs the static route.
- When the interface goes down, Dell Networking OS withdraws the route.
- When the interface comes up, Dell Networking OS re-installs the route.
- When recursive resolution is "broken," Dell Networking OS withdraws the route.
- When recursive resolution is satisfied, Dell Networking OS re-installs the route.

You cannot use the VRF attribute of this command to configure routes in a management VRF. When a specific VRF is deleted, all the configured static routes corresponding to that VRF are automatically removed.

Related Commands

show ip route — views the switch routing table.

ip source-route

Enable Dell Networking OS to forward IP packets with source route information in the header.

S6000

Syntax

```
ip source-route
```

To drop packets with source route information, use the `no ip route-source` command.

Defaults	Enabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

ip tcp initial-time

Define the wait duration in seconds for the TCP connection to be established. This command is supported on the , , S6000, and platforms.

Syntax

```
ip tcp initial-time <8-75>
```

To restore the default behavior, which causes the wait period to be set as 8 seconds, use the `no ip tcp initial-time` command

Parameters

<8-75>	Wait duration in seconds for the TCP connection to be established.

Command Modes	CONFIGURATION
Command History	

Version 9.3(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information	You can configure the amount of time for which the device must wait before it attempts to establish a TCP connection. Using this capability, you can limit the wait times for TCP connection requests. Upon responding to the initial SYN packet that requests a connection to the router for a specific service (such as SSH or BGP) with a SYN ACK, the router waits for a period of time for the ACK packet to be sent from the requesting host that will establish the TCP connection.

ip unknown-unicast

Enable IPv4 catch-all route.

S6000

Syntax

```
ip unknown-unicast [vrf vrf-name]
```

To remove the IPv4 catch-all route (0.0.0.0/0) from the LPM route forwarding table in hardware which gets added as a default configuration after the initialization of FIB Agent module, use the `no ip unknown-unicast` command.

Defaults

None

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` followed by the name of the VRF to enable catch-all routes corresponding to that VRF.

Command Modes

CONFIGURATION

Command History

Version 9.4(0.0)	Introduced on the S−Series.

Usage Information

Use this command to add the IPv4 catch-all route (0.0.0.0/0) in the LPM route forwarding table if it was deleted using the `no ip unknown-unicast` command previously. This will be the default configuration after reload.

ipv4 unicast-host-route

Enable programming of IPv4 /32 route prefixes in L3 host table.

S6000

Syntax

```
[no] ipv4 unicast-host-route
```

Defaults

Disabled by default. By default, all the IPv4 route prefixes are installed only in the LPM table.

Command Modes	CONFIGURATION
Command History	**Version 9.3(0.1)** Introduced on the S6000.
Usage Information	A warning message is displayed when you enter this command stating that this setting takes effect for existing routes only when IPv4 route prefixes are cleared from the routing table (RTM). To disable this functionality, use no ipv4 unicast-host-route command.

Example

```
Dell(conf)#ip unicast-host-route
Warning: Command will take effect for existing routes only
when IPv4
route prefixes are cleared from RTM
Dell(conf)#no ip unicast-host-route
```

show ip tcp initial-time

Displays the interval that you configured for the device to wait before the TCP connection is attempted to be established. This command is supported on the , , S6000, , and MXL platforms.

Syntax	`show ip tcp initial-time`
Command Modes	EXEC EXEC Privilege
Command History	**Version 9.3(0.0)** Introduced on the S4810, S4820T, S6000, Z9000, and MXL platforms.

ip unreachables

Enable the generation of internet control message protocol (ICMP) unreachable messages.

S6000

Syntax	`ip unreachables` To disable the generation of ICMP messages, use the `no ip unreachables` command.
Defaults	Disabled.
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

load-balance

By default, for C-Series and S-Series, Dell Networking OS uses an IP 4-tuple (IP SA, IP DA, Source Port, and Destination Port) to distribute IP traffic over members of a Port Channel as well as equal-cost paths. To designate another method to balance traffic over Port Channel members, use the `load-balance` command.

S6000

Syntax

```
load-balance {ip-selection [dest-ip | source-ip]} | {mac [dest-
mac | source-dest-mac | source-mac]} | {tcp-udp | ingress-port
[enable]}
```

To return to the default setting (IP 4-tuple), use the `no load-balance {ip-selection [dest-ip | source-ip]} | {mac [dest-mac | source-dest-mac | source-mac]} | {tcp-udp | ingress-port [enable]}` command.

Parameters

ip-selection {dest-ip | source-ip}	Enter the keywords to distribute IP traffic based on the following criteria: • `dest-ip` — Uses destination IP address and destination port fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded. • `source-ip` — Uses source IP address and source port fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded.

mac {dest-mac | source-dest-mac | source-mac}	Enter the keywords to distribute MAC traffic based on the following criteria: • `dest-mac` — Uses the destination MAC address, VLAN, Ethertype, source module ID and source port ID fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded. • `source-dest-mac` — Uses the destination and source MAC address, VLAN, Ethertype, source module ID and source port ID fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded. • `source-mac` — Uses the source MAC address, VLAN, Ethertype, source module ID and source port ID fields to hash. The hashing mechanism returns a 3-bit index indicating which port the packet should be forwarded.
tcp-udp enable	Enter the keywords to distribute traffic based on the following: • `enable` — Takes the TCP/UDP source and destination ports into consideration when doing hash computations. This option is enabled by default.
ingress-port enable	Enter the keywords to distribute traffic based on the following: • `enable` — Takes the source port into consideration when doing hash computations. This option is disabled by default.

Defaults IP 4-tuple (IP SA, IP DA, Source Port, Destination Port)

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.0	Added the `ingress-port` parameter for the S4810.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.

Usage Information

By default, Dell Networking OS distributes incoming traffic based on a hash algorithm using the following criteria:

- IP source address
- IP destination address
- TCP/UDP source port
- TCP/UDP destination port

load-balance hg

Choose the traffic flow parameters the hash calculation uses while distributing the traffic across internal higig links.

S6000

Syntax

`[no] load-balance hg { ip-selection | ipv6-selection [`*`source-ip | source-ipv6 | source-port-id | source-module-id | dest-ip | dest-ipv6 | dest-port-id | dest-module-id | protocol | vlan | L4-source-port | L4-dest-port`*` ] | mac [`*`source-mac | source-port-id | source-module-id | dest-mac | dest-port-id | dest-module-id | vlan | ethertype | source-dest-mac`*` ] | tunnel [`*`ipv4-over-ipv4 | ipv4-over-gre-ipv4 | mac-in-mac`*`]}`

Parameters

{ip-selection| ipv6-selection [*source-ip | source-ipv6 | source-port-id | source-module-id | dest-ip | dest-ipv6 | dest-port-id | dest-module-id | protocol | vlan | L4-source-port | L4-dest-port*]	To use IPv4 key fields in hash computation, enter the keyword `ip-selection` then one of the parameters. To use IPv6 key fields in hash computation, enter the keyword `ipv6-selection` then one of the parameters. • source-ip — Use IPv4 src-ip field in hash calculation. • source-ipv6 — Use IPv6 src-ip field in hash calculation • source-port-id — Use src-port-id field in hash calculation. • source-module-id — Use src-module-id field in hash calculation. • dest-ip — Use IPv4 dest-ip field in hash calculation. • dest-ipv6 — Use IPv6 dest-ip field in hash calculation • dest-port-id — Use dest-port-id field in hash calculation. • dest-module-id — Use dest-module-id field in hash calculation. • protocol — Use IPv4 protocol field in hash calculation. • vlan — Use vlan field in hash calculation. • L4-source-port — Use IPv4 L4-source-port field in hash calculation. • L4-dest-port — Use IPv4 L4-dest-port field in hash calculation.

mac [*source-mac* | *source-port-id* | *source-module-id* | *dest-mac* | *dest-port-id* | *dest-module-id* | *vlan* | *ethertype* | *source-dest-mac*]	To use MAC key fields in hash computation, enter the keyword `mac` then one of the parameters: • source-mac — Use source-mac field in hash calculation. • source-port-id — Use src-port-id field in hash calculation. • source-module-id — Use src-module-id field in hash calculation. • dest-mac — Use dest-mac field in hash calculation. • dest-port-id — Use dest-port-id field in hash calculation. • dest-module-id — Use dest-module-id field in hash calculation. • vlan — Use vlan field in hash calculation . • ethertype — Use Ethertype field in hash calculation. • source-dest-mac — Use SMAC and DMAC fields in hash calculation.
tunnel [*ipv4-over-ipv4* | *ipv4-over-gre-ipv4* | *mac-in-mac*]}	To use tunnel key fields in hash computation, enter the keyword `tunnel` then one of the parameters: • ipv4-over-ipv4 — Use ipv4-over-ipv4 field in hash calculation. • ipv4-over-gre-ipv4 — Use ipv4-over-gre-ipv4 field in hash calculation. • mac-in-mac — Use mac-in-mac field in hash calculation.

Defaults IP selection 5-tuples (source-ip dest-ip vlan protocol L4-source-port L4-dest-port).

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Added support for IPv6.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

management route

Configure a static route that points to the Management interface or a forwarding router.

S6000

Syntax

`management route {{ip-address mask | {ipv6-address prefix-length}} {forwarding-router-address | managementethernet}`

To remove a static route, use the `no management route{{ip-address mask | {ipv6-address prefix-length}}{forwarding-router-address | managementethernet}` command.

Parameters

ip-address mask	Enter an IP address (dotted decimal format) and mask (/prefix format) of the destination subnet.
ipv6-address prefix-length	Enter an IPv6 address (x:x:x:x::x format) and mask (/prefix format) of the destination subnet. Enter the IPv6 address in the x:x:x:x::x format followed by the prefix length in the /x format. The range is from /0 to /128. NOTE: The :: notation specifies successive hexadecimal fields of zeros.
forwarding-router-address	Enter an IP address (dotted decimal format) or an IPv6 address (x:x:x:x::x format) of a forwarding router.
managementethernet	Enter the keyword `managementethernet` for the Management interface on the Primary RPM.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000 and added support for IPv6.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

When a static route (or a protocol route) overlaps with Management static route, the static route (or a protocol route) is preferred over the Management Static route. Also, Management static routes and the Management Connected prefix are not reflected in the hardware routing tables. Separate routing tables are maintained for IPv4 and IPv6 management routes. This command manages both tables.

Related Commands

interface ManagementEthernet — configures the Management port on the system (either the Primary or Standby RPM).

speed (Management interface) — sets the speed for the Management interface.

show arp

Display the ARP table.

S6000

Syntax

```
show arp [vrf vrf-name] [interface interface | ip ip-address
[mask] | macaddress mac-address [mac-address mask]] [retries]
[static | dynamic] [inspection {database | statistics][summary]
```

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF. NOTE: Use this attribute to start a BGP instance for either a specific address family corresponding to the default VRF or an IPv4 address family corresponding to a non-default VRF.
interface *interface*	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For the Management interface, enter the keyword `managementethernet` then the slot/port information. • For a Port Channel interface, enter the keyword `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

ip *ip-address mask*	(OPTIONAL) Enter the keyword `ip` then an IP address in the dotted decimal format. Enter the optional IP address mask in the slash prefix format (/ x).
inspection	Enter the keyword `inspection` with one of the following keywords to view ARP entries: • `database` — view a list of ARP entries learned using DAI • `statistics` — view DAI statistics
macaddress *mac-address mask*	(OPTIONAL) Enter the keyword `macaddress` then a MAC address in nn:nn:nn:nn:nn:nn format. Enter the optional MAC address mask in nn:nn:nn:nn:nn format also.
static	(OPTIONAL) Enter the keyword `static` to view entries entered manually.
retries	(OPTIONAL) Enter the keyword `retries` to show the number of ARP retries before a 20–second back off.
dynamic	(OPTIONAL) Enter the keyword `dynamic` to view dynamic entries.
summary	(OPTIONAL) Enter the keyword `summary` to view a summary of ARP entries.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF and added usage information for the `clear arp-cache` command.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added support for 4094 VLANs on the E-Series ExaScale (the prior limit was 2094).
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.9.1.0	Introduced VRF on the E-Series.
Version 7.8.1.0	Augmented to display local ARP entries learned from private VLANs (PVLANs).

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following example shows two VLANs that are associated with a private VLAN (PVLAN) (refer to Private VLAN (PVLAN)).

If you have entered the `clear arp-cache` command to remove a large number of ARP entries and the command is still being processed in the background, an error message display if you attempt to enter the `show arp` command:

```
Clear arp in-progress. Please try after sometime!
```

The following describes the `show arp` command shown in the following example.

Description	
Protocol	Displays the protocol type.
Address	Displays the IP address of the ARP entry.
Age(min)	Displays the age (in minutes) of the ARP entry.
Hardware Address	Displays the MAC address associated with the ARP entry.
Interface	Displays the first two letters of the interfaces type and the slot/port associated with the ARP entry.
VLAN	Displays the VLAN ID, if any, associated with the ARP entry.
CPU	Lists which CPU the entries are stored on.

Example

```
Dell>show arp
Protocol  Address  Age(min) Hardware Address Interface VLAN CPU
-----------------------------------------------------------
Internet  192.2.1.254 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.253 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.252 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.251 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.250 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.251 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.250 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.249 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.248 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.247 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.246 1  00:00:c0:02:01:02  Gi 9/13  -    CP
Internet  192.2.1.245 1  00:00:c0:02:01:02  Gi 9/13  -    CP
```

Example (Private VLAN)

NOTE: In this example, Line 1 shows community VLAN 200 (in primary VLAN 10) in a PVLAN. Line 2 shows primary VLAN 10.

```
Dell#show arp
Protocol Address  Age(min) Hardware Address  Interface VLAN
CPU
---------------------------------------------------------------
Internet 5.5.5.1       -  00:01:e8:43:96:5e  -      Vl 10 pv
200 CP
```

```
Internet 5.5.5.10      -  00:01:e8:44:99:55  -      Vl
10         CP
Internet 10.1.2.4      1  00:01:e8:d5:9e:e2  Ma 0/0
-             CP
Internet 10.10.10.4    1  00:01:e8:d5:9e:e2  Ma 0/0
-             CP
Internet 10.16.127.53  1  00:01:e8:d5:9e:e2  Ma 0/0
-             CP
Internet 10.16.134.254 20 00:01:e8:d5:9e:e2  Ma 0/0
-             CP
Internet 133.33.33.4   1  00:01:e8:d5:9e:e2  Ma 0/0
-             CP
```

Usage Information

The following describes the `show arp summary` command shown in the following example.

Description	
Total Entries	Lists the total number of ARP entries in the ARP table.
Static Entries	Lists the total number of configured or static ARP entries.
Dynamic Entries	Lists the total number of learned or dynamic ARP entries.
CPU	Lists which CPU the entries are stored on.

Example (Summary)

```
#show arp summary

TotalEntries Static Entries Dynamic Entries CPU
----------------------------------------------
83           0              83           CP
Dell
```

Related Commands

ip local-proxy-arp — enables/disables Layer 3 communication in secondary VLANs.

switchport mode private-vlan — sets PVLAN mode of the selected port.

show arp retries

Display the configured number of ARP retries.

S6000

Syntax

```
show arp retries
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced.

Related Commands

arp retries — sets the number of ARP retries in case the system does not receive an ARP reply in response to an ARP request.

show hosts

View the host table and DNS configuration.

S6000

Syntax `show hosts`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Added support for IPv6 addresses.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show hosts` command in the following example.

Field	Description
Default domain...	Displays the domain name (if configured).

Field	Description
Name/address lookup...	States if DNS is enabled on the system. • If DNS is enabled, the Name/Address lookup is domain service. • If DNS is not enabled, the Name/Address lookup is static mapping
Name servers are...	Lists the name servers, if configured.
Host	Displays the host name assigned to the IP address.
Flags	Classifies the entry as one of the following: • perm — the entry was manually configured and will not time out • temp — the entry was learned and will time out after 72 hours of inactivity. Also included in the flag is an indication of the validity of the route: • ok — the entry is valid. • ex — the entry expired. • ?? — the entry is suspect.
TTL	Displays the amount of time until the entry ages out of the cache. For dynamically learned entries only.
Type	Displays IP as the type of entry.
Address	Displays the IP addresses assigned to the host.

Example

```
Dell#show hosts
Default domain is not set
Name/address lookup uses static mappings
Name servers are not set
Host      Flags     TTL   Type   Address
--------  -----     ----  ----   -------
ks       (perm, OK) -     IP     2.2.2.2
4200-1   (perm, OK) -     IP     192.68.69.2
1230-3   (perm, OK) -     IP     192.68.99.2
ZZr      (perm, OK) -     IP     192.71.18.2
Z10-3    (perm, OK) -     IP     192.71.23.1
Dell#
```

Related Commands

traceroute — views the DNS resolution.

ip host — configures a host.

show ip cam stack-unit

Display CAM entries for a port-pipe of a stack-unit on a S-Series or Z-Series switch.

S6000

Syntax

```
show ip cam stack-unit {id} [port-set {pipe-number} | vrf vrf-name {ip-address mask [longer-prefixes [ecmp-group detail]]}| ecmp-group {detail | member-info [detail [group-index index-number]]}| summary]
```

Parameters

id	Enter the stack-unit ID. The unit ID range is from 0 to 7 for the S6000.
port-set *pipe-number*	Enter the keyword `port-set` then the number of the stack unit's port-pipe. The unit ID range is from 0 to 0 for the S6000.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to display CAM entries corresponding to that VRF.
network mask [longer-prefixes [ecmp-group detail]]	(OPTIONAL) Enter the IP address and mask of a route to CAM entries for that route only. You can enter one of the following keywords to filter results. • Enter the keyword `longer-prefixes` to view routes with a common prefix. • Enter the keyword `ecmp-group detail` to view the ECMP group index.
ecmp-group {detail | member-info [detail [group-index *index-number*]]}	(OPTIONAL) Enter the keyword `ecmp-group` then one of the following keywords to filter results. • Enter the keyword `detail` to view the ECMP group index. • Enter the keyword `member-info` to view the member information for the ECMP group. • Enter the keyword `member-info detail` to view detailed ECMP membership and n-hop information. • Enter the keyword `group-index` then the index number to show ECMP membership per group. The range is from 0 to 1022.
summary	(OPTIONAL) Enter the keyword `summary` to view a table listing route prefixes and the total number routes which can be entered in to CAM.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Added support for up to seven stack members.
Version 7.6.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip cam` command shown in the following example.

Field	Description
Destination	Displays the destination route of the index.
EC	Displays 1 if the route is an ECMP route. Else, displays 0.
C	This is the CPU bit. If it displays 1, then it indicates that a packet hitting this entry will be forwarded to the CPU.
V Id	Displays the VLAN ID. If the entry is 0, the entry is not part of a VLAN.
Mac Addr	Displays the next-hop router's MAC address.
Port	Displays the egress interface. • CP = control processor • Gi = Gigabit Ethernet interface • Te = 10–Gigabit Ethernet interface

Example

```
Dell#show ip cam stack-unit 7 po 0 1.1.1.0/24 longer-prefixes

Destination            EC  C    VId   Mac-Addr             Port
----------------------------------------------------------------
-----
1.1.1.2/32              0  0   3000   00:05:00:00:00:02    Te
7/44
1.1.1.1/32              0  1      0   00:00:00:00:00:00      CP
1.1.1.0/24              0  1      0   00:00:00:00:00:00      CP
Dell#
```

Example (ECMP-Group)

```
Dell#show ip cam stack-unit 7 po 0 ecmp-group detail

Destination            EC  C    VId   Mac-Addr
Port            ECMP Group-Index
----------------------------------------------------------------
----------------------------
```

```
1.1.1.2/32              0  0   1000   00:01:00:00:00:02    Te 
7/42              -
2.1.1.2/32              0  0     20   00:03:00:00:00:02    Po 
10                -
2.1.1.1/32              0  1      0   00:00:00:00:00:00        
CP                 -
1.1.1.1/32              0  1      0   00:00:00:00:00:00        
CP                 -
2.1.1.0/24              0  1      0   00:00:00:00:00:00        
CP                 -
1.1.1.0/24              0  1      0   00:00:00:00:00:00        
CP                 -
100.1.1.0/24            1  0     20   00:03:00:00:00:02    Po 
10                0
100.1.1.0/24            1  0   1000   00:01:00:00:00:02    Te 
7/42              0
0.0.0.0/0               0  1      0   00:00:00:00:00:00        
CP                 -
Dell#
```

Example (Member-Info)

```
Dell#show ip cam stack-unit 7 po 0 ecmp-group member-info 
detail

Group Index  Member Count   Mac-Addr                          
Port        VLan ID
-----------------------------------------------------------------
-----------------
0                 2       00:03:00:00:00:02         Po 
10            20
                          00:01:00:00:00:02         Te 
7/42        1000
Dell#
```

show ip fib stack-unit

View all Forwarding Information Base (FIB) entries of a specific stack-unit.

S6000

Syntax

```
show ip fib stack-unit id vrf vrf-name [ip-address [mask] 
[longer-prefixes] | summary]
```

Parameters

id	Enter the S-Series stack unit ID. The unit ID range is from 0 to 7 for the S6000.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view FIB entries corresponding to that VRF.
ip-address mask	(OPTIONAL) Enter the IP address of the network destination to view only information on that destination. Enter the IP address in dotted decimal format (A.B.C.D). Enter the mask in slash prefix format (/X).
longer-prefixes	(OPTIONAL) Enter the keywords `longer-prefixes` to view all routes with a common prefix.

summary	(OPTIONAL) Enter the keyword `summary` to view the total number of prefixes in the FIB.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Added support for up to seven stack members.
Version 7.6.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip fib stack-unit` command shown in the following example.

Field	Description
Destination	Lists the destination IP address.
Gateway	Displays either the word "direct" and an interface for a directly connected route or the remote IP address used to forward the traffic.
First-Hop	Displays the first hop IP address.
Mac-Addr	Displays the MAC address.
Port	Displays the egress-port information.
VId	Displays the VLAN ID. If no VLAN is assigned, zero (0) is listed.
EC	Displays the number of ECMP paths.

Example

```
Dell#show ip fib stack-unit 0

Destination   Gateway                 First-Hop  Mac-
Addr            Port       VId    EC
---------------------------------------------------------------
----------------------------
1.1.1.2/32    via 1.1.1.2, Vl 1000    1.1.1.2
00:01:00:00:00:02   Te 7/42    1000   0
2.1.1.2/32    via 2.1.1.2, Vl 20      2.1.1.2
00:03:00:00:00:02   Po 10        20   0
```

```
0.0.0.0/0              -                 0.0.0.0
00:00:00:00:00:00   CP             0    0
1.1.1.0/24     Direct, Vl 1000          0.0.0.0
00:00:00:00:00:00   CP          1000    0
1.1.1.1/32     via 127.0.0.1            127.0.0.1
00:00:00:00:00:00   CP             0    0
2.1.1.0/24     Direct, Vl 20            0.0.0.0
00:00:00:00:00:00   CP            20    0
2.1.1.1/32     via 127.0.0.1            127.0.0.1
00:00:00:00:00:00   CP             0    0
100.1.1.0/24  via 1.1.1.2, Vl 1000     1.1.1.2
00:01:00:00:00:02   Te 7/42     1000    1
100.1.1.0/24  via 2.1.1.2, Vl 20       2.1.1.2
00:03:00:00:00:02   Po 10         20    1
Dell#
```

Related Commands

[clear ip fib stack-unit](#) — clear FIB entries on a specified stack-unit.

show ip flow

Show how a Layer 3 packet is forwarded when it arrives at a particular interface.

S6000

Syntax

`show ip flow interface interface {source-ip address destination-ip address} {protocol number [tcp | udp]} {src-port number destination-port number}`

Parameters

interface *interface*	Enter the keyword *interface* then one of the following interface keywords. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
source-ip *address*	Enter the keywords `source-ip` then the IP source address in IP address format.
destination-ip *address*	Enter the keywords `destination-ip` then the IP destination address in IP address format.
protocol *number* [tcp | udp]	Enter the keyword `protocol` then one of the protocol type keywords: `tcp`, `udp`, or `protocol` *`number`* The protocol number range is from 0 to 255. .
src-port *number*	Enter the keywords *src-port* then the source port number.
destination-port *number*	Enter the keywords *destination-port* then the destination port number.

Command Modes	EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.9.1.0	Introduced VRF on the E-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

This command provides egress port information for a given IP flow. This information is useful in identifying which interface the packet follows in the case of Port-channel and Equal Cost Multi Paths. Use this command for routed packed only. For switched packets, use the `show port-channel-flow` command.

The `show ip flow` command does not compute the egress port information when `load-balance mac hashing` is also configured due to insufficient information (the egress MAC is not available).

S-Series produces the following error message: `%Error: Unable to read IP route table`.

Example

```
Dell#show ip flow interface Gi 1/8 189.1.1.1 63.0.0.1 protocol
tcp source-port 7898 destination-port 8
```

flow: 189.1.1.1 63.0.0.1 protocol 6 7868 8976

```
Ingress interface:Gi 1/20
Egress interface:Gi 1/14 to 1.7.1.2[CAM hit 103710]
unfragmented packet
                 Gi 1/10 to 1.2.1.2[CAM hit 103710] fragmented
packet
```

show ip interface

View IP-related information on all interfaces.

S6000

Syntax

```
show ip interface [interface | brief] [configured]
```

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information, the valid range of slot number is from 0 to 5: • For a Loopback interface, enter the keyword `Loopback` then a number from 0 to 16383. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For the Management interface, enter the keyword `ManagementEthernet` then zero (0). • For the Null interface, enter the keyword `null` then zero (0). • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a stack-unit interface, enter the keyword `stack-unit` then the stack unit number. The range is from 0 to 7. • For a tunnel interface, enter the keyword `tunnel` then the tunnel interface number. The range is from 1 to 16383. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.
brief	(OPTIONAL) Enter the keyword `brief` to view a brief summary of the interfaces and whether an IP address is assigned.
configured	(OPTIONAL) Enter the keyword `configured` to display the physical interfaces with non-default configurations only.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.2	Supported on the E-Series ExaScale E600i.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip interface` command shown in the following example.

Lines	Description
TenGigabitEthernet 0/0...	Displays the interface's type, slot/port, and physical and line protocol status.
Internet address...	States whether an IP address is assigned to the interface. If an IP address is assigned, that address is displayed.
IP MTU is...	Displays IP MTU value.
Inbound access...	Displays the name of the configured incoming access list. If none is configured, the phrase "not set" is displayed.
Proxy ARP...	States whether proxy ARP is enabled on the interface.
Split horizon...	States whether split horizon for RIP is enabled on the interface.
Poison Reverse...	States whether poison for RIP is enabled on the interface.
ICMP redirects...	States if ICMP redirects are sent.
ICMP unreachables...	States if ICMP unreachable messages are sent.

Example

```
Dell#show ip int te 0/0
TenGigabitEthernet 0/0 is down, line protocol is down
Internet address is not set
IP MTU is 1500 bytes
Inbound access list is not set
Proxy ARP is enabled
Split Horizon is enabled
Poison Reverse is disabled
ICMP redirects are not sent
ICMP unreachables are not sent

Dell#
```

Usage Information

The following describes the `show ip interface brief` command shown in the following example.

Fields	Description
Interface	Displays type of interface and the associated slot and port number.
IP-Address	Displays the IP address for the interface, if configured.
Ok?	Indicates if the hardware is functioning properly.
Method	Displays “Manual” if the configuration is read from the saved configuration.
Status	States whether the interface is enabled (up) or disabled (administratively down).
Protocol	States whether IP is enabled (up) or disabled (down) on the interface.

Example (Brief)

```
Dell#show ip int brief
Interface            IP-Address  OK? Method
Status              Protocol
GigabitEthernet 1/0  unassigned  NO  Manual  administratively
down down
GigabitEthernet 1/1  unassigned  NO  Manual  administratively
down down
GigabitEthernet 1/2  unassigned  YES Manual
up                    up
GigabitEthernet 1/3  unassigned  YES Manual
up                    up
GigabitEthernet 1/4  unassigned  YES Manual
up                    up
GigabitEthernet 1/5  10.10.10.1  YES Manual
up                    up
GigabitEthernet 1/6  unassigned  NO  Manual  administratively
down down
```

show ip management-route

View the IP addresses assigned to the Management interface.

S6000

Syntax `show ip management-route [all | connected | summary | static]`

Parameters

all	(OPTIONAL) Enter the keyword `all` to view all IP addresses assigned to all Management interfaces on the switch.
connected	(OPTIONAL) Enter the keyword `connected` to view only routes directly connected to the Management interface.

summary	(OPTIONAL) Enter the keyword `summary` to view a table listing the number of active and non-active routes and their sources.
static	(OPTIONAL) Enter the keyword `static` to view non-active routes also.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show ip management-route

Destination     Gateway                    State
-----------     -------                    -----
10.1.2.0/24     ManagementEthernet 0/0     Connected
172.16.1.0/24   10.1.2.4                   Active
Dell#
```

show ipv6 management-route

Display the IPv6 static routes configured for the management interface.

S6000

Syntax `show ipv6 management-route [all | connected | summary | static]`

Parameters

all	(OPTIONAL) Enter the keyword `all` to view all IP addresses assigned to all Management interfaces on the switch.

connected	(OPTIONAL) Enter the keyword `connected` to view only routes directly connected to the Management interface.
summary	(OPTIONAL) Enter the keyword `summary` to view a table listing the number of active and non-active routes and their sources.
static	(OPTIONAL) Enter the keyword `static` to view non-active routes also.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.4.1.0	Introduced on the C- and E-Series.
Version 8.3.7.0	Introduced on the S4810.

Example

```
Dell#show ipv6 management-route
IPv6 Destination   Gateway                State
----------------    -------               -----
2001:34::0/64      ManagementEthernet 0/0  Connected
2001:68::0/64      2001:34::16            Active
Dell#
```

show ip protocols

View information on all routing protocols enabled and active on the switch.

S6000

Syntax

`show ip protocols`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Regular evaluation optimization enabled/disabled added to display output.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show ip protocols
Routing Protocol is "bgp 1"
  Cluster Id is set to 20.20.20.3
  Router Id is set to 20.20.20.3
  Fast-external-fallover enabled
  Regular expression evaluation optimization enabled
  Capable of ROUTE_REFRESH
  For Address Family IPv4 Unicast
   BGP table version is 0, main routing table version 0
   Distance: external 20 internal 200 local 200
   Neighbor(s):
     Address : 20.20.20.2
     Filter-list in : foo
     Route-map in : foo
     Weight : 0
   Address : 5::6
     Weight : 0
Dell#
```

show ip route

View information, including how they were learned, about the IP routes on the switch.

S6000

Syntax

`show ip route [vrf vrf-name] hostname | ip-address [mask] [longer-prefixes] | list prefix-list | protocol [process-id | routing-tag] | all | connected | static | summary]`

Parameters

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the VRF name to list the routes in the route table of a specific VRF.

ip-address	(OPTIONAL) Specify a name of a device or the IP address of the device to view more detailed information about the route.
mask	(OPTIONAL) Specify the network mask of the route. Use this parameter with the IP address parameter.
longer-prefixes	(OPTIONAL) Enter the keywords `longer-prefixes` to view all routes with a common prefix.
list *prefix-list*	(OPTIONAL) Enter the keyword `list` and the name of a configured prefix list. For more information, refer to the show ip route list command.
protocol	(OPTIONAL) Enter the name of a routing protocol (`bgp`, `isis`, `ospf`, `rip`) or the keywords connected or static. NOTE: `bgp`, `isis`, `ospf`, and `rip`. • If you enter `bgp`, you can include the BGP *`as-number`* . • If you enter `isis`, you can include the ISIS *`routing-tag`*. • If you enter `ospf`, you can include the OSPF *`process-id`*.
process-id	(OPTIONAL) Specify that only OSPF routes with a certain process ID must be displayed.
routing-tag	(OPTIONAL) Specify that only ISIS routes with a certain routing tag must be displayed.
connected	(OPTIONAL) Enter the keyword `connected` to view only the directly connected routes.
all	(OPTIONAL) Enter the keyword `all` to view both active and non-active routes.
static	(OPTIONAL) Enter the keyword `static` to view only routes the `ip route` command configures.
summary	(OPTIONAL) Enter the keyword `summary`. For more information, refer to the show ip route summary command.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.9.1.0	Introduced VRF on the E-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip route all` command in the following example.

Field	Description
(undefined)	Identifies the type of route: • C = connected • S = static • R = RIP • B = BGP • IN = internal BGP • EX = external BGP • LO = Locally Originated • O = OSPF • IA = OSPF inter area • N1 = OSPF NSSA external type 1 • N2 = OSPF NSSA external type 2 • E1 = OSPF external type 1 • E2 = OSPF external type 2 • i = IS-IS • L1 = IS-IS level-1 • L2 = IS-IS level-2 • IA = IS-IS inter-area • * = candidate default • > = non-active route • + = summary routes
Destination	Identifies the route’s destination IP address
Gateway	Identifies whether the route is directly connected and on which interface the route is configured.

Field	Description
Dist/Metric	Identifies if the route has a specified distance or metric.
Last Change	Identifies when the route was last changed or configured.

Example

```
Dell#show ip route all

Codes:C- connected, S - static, R - RIP
      B- BGP, IN - internal BGP, EX - external BGP, LO -
Locally Originated
      O- OSPF, IA - OSPF inter area N1 - OSPF NSSA external
type 1
      N2- OSPF NSSA external type 2, E1 - OSPF external type 1
      E2- OSPF external type 2, i - IS-IS, L1 - IS-IS level-1
      L2- IS-IS level-2, IA - IS-IS inter area, * - candidate
default
      >- non-active route + - summary route

Gateway of last resort is not set

     Destination     Gateway            Dist/Metric Last Change
----------- ------- ----------- -----------
R   3.0.0.0/8       via 100.10.10.10, So 2/8 120/1   00:07:12
                    via 101.10.10.10, So 2/9
    100.10.10.0/24  Direct, So 2/8           0/0     00:08:54
> R 100.10.10.0/24  Direct, So 2/8           120/0   00:08:54
C   101.10.10.0/24  Direct, So 2/9           0/0     00:09:15
> R 101.10.10.0/24  Direct, So 2/9           120/0   00:09:15
Dell#
```

Example (Summary)

```
Dell#show ip route summary

Route Source  Active Routes   Non-active Routes
connected     2               0
static        1               0
Total         3               0
Total 3 active route(s) using 612 bytes
R1_E600i>show ip route static ?
|                    Pipe through a command
<cr>
R1_E600i>show ip route static
    Destination   Gateway            Dist/Metric Last Change
----------- ------- ----------- -----------
*S  0.0.0.0/0     via 10.10.91.9, Gi 1/2     1/0        3d2h
Dell>
```

Example (vrf)

```
Dell#show ip route vrf test1

Codes: C - connected, S - static, R - RIP,
       B - BGP, IN - internal BGP, EX - external BGP,LO -
Locally Originated,
       O - OSPF, IA - OSPF inter area, N1 - OSPF NSSA external
type 1,
N2 - OSPF NSSA external type 2, E1 - OSPF external type 1,
E2 - OSPF external type 2, i - IS-IS, L1 - IS-IS level-1,
       L2 - IS-IS level-2, IA - IS-IS inter area, * -
candidate default,
> - non-active route, + - summary route

Gateway of last resort is not set
```

```
   Destination    Gateway         Dist/Metric Last Change
   -----------    -------         ----------- -----------
C  13.0.0.0/24    Direct, Te 0/17      0/0    00:00:04
```

show ip route list

Display IP routes in an IP prefix list.

S6000

Syntax `show ip route vrf vrf-name list prefix-list`

Parameters

prefix-list	Enter the name of a configured prefix list.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to display IP routes in an IP prefix list corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show ip route list test

Codes:C- connected, S - static, R - RIP,
      B- BGP, IN - internal BGP, EX - external BGP,LO -
Locally Originated,
      O- OSPF, IA - OSPF inter area, N1 - OSPF NSSA external
type 1,
      N2- OSPF NSSA external type 2, E1 - OSPF external type 1,
      E2- OSPF external type 2, i - IS-IS, L1 - IS-IS level-1,
      L2- IS-IS level-2, IA - IS-IS inter area, * - candidate
default,
      >- non-active route, + - summary route

Gateway of last resort is not set

    Destination    Gateway              Dist/Metric Last Change
    -----------    -------              ----------- -----------
R   2.1.0.0/24   via 2.1.4.1, Gi 4/43   120/2       3d0h
R   2.1.1.0/24   via 2.1.4.1, Gi 4/43   120/2       3d1h
R   2.1.2.0/24   via 2.1.4.1, Gi 4/43   120/1       3d0h
R   2.1.3.0/24   via 2.1.4.1, Gi 4/43   120/1       3d1h
C   2.1.4.0/24   Direct, Gi 4/43          0/0       3d1h
```

Related Commands

ip prefix-list — enters CONFIGURATION-IP PREFIX-LIST mode and configures a prefix list.

show ip prefix-list summary — displays a summary of the configured prefix lists.

show ip route summary

View a table summarizing the IP routes in the switch.

S6000

Syntax

`show ip route vrf *vrf-name* summary`

Parameters

vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view information on the IP routes corresponding to that VRF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip route summary` shown in the following example.

Column Heading	Description
Route Source	Identifies how the route is configured in Dell Networking OS.
Active Routes	Identifies the best route if a route is learned from two protocol sources.
Non-active Routes	Identifies the back-up routes when a route is learned by two different protocols. If the best route or active route goes down, the non-active route becomes the best route.
ospf 100	If routing protocols (OSPF, RIP) are configured and routes are advertised, then information on those routes is displayed.
Total 1388 active...	Displays the number of active and non-active routes and the memory usage of those routes. If there are no routes configured in the Dell Networking OS, this line does not appear.

Example

```
Dell>show ip route summary

Route Source   Active Routes   Non-active Routes
connected      17              0
static         3               0
ospf 100       1368            2
Intra-area: 762 Inter-area: 1 External-1: 600 External-2: 5
Total          1388            2
Total 1388 active route(s) using 222440 bytes
Total 2 non-active route(s) using 128 bytes
Dell>
```

Related Commands

show ip route — displays information about the routes found in the switch.

show ip traffic

View IP, ICMP, UDP, TCP and ARP traffic statistics.

S6000

Syntax	`show ip traffic [all | cp | rp1 | rp2]` **NOTE:** These options are supported only on the E-Series.

Parameters

all	(OPTIONAL) Enter the keyword `all` to view statistics from all processors. If you do not enter a keyword, you also view all statistics from all processors.
cp	(OPTIONAL) Enter the keyword `cp` to view only statistics from the Control Processor.
rp1	(OPTIONAL) Enter the keyword `rp1` to view only the statistics from Route Processor 1.
rp2	(OPTIONAL) Enter the keyword `rp2` to view only the statistics from Route Processor 2.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	F10 Monitoring MIB available for the `ip traffic statistics` command.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip traffic` summary shown in the following example.

Keyword	Definition
unknown protocol...	No receiver for these packets. Counts packets whose protocol type field is not recognized by Dell Networking OS.
not a gateway...	Packets can not be routed; the host/network is unreachable.
security failures...	Counts the number of received unicast/multicast packets that could not be forwarded due to: • route not found for unicast/multicast; ingress interfaces do not belong to the destination multicast group • destination IP address belongs to reserved prefixes; the host/network is unreachable
bad options...	Unrecognized IP option on a received packet.
Frags:	IP fragments received.
... reassembled	Number of IP fragments that were reassembled.
... timeouts	Number of times a timer expired on a reassembled queue.
... too big	Number of invalid IP fragments received.
... couldn’t fragment	Number of packets that could not be fragmented and forwarded.
...encapsulation failed	Counts packets which could not be forwarded due to ARP resolution failure. Dell Networking OS sends an arp request prior to forwarding an IP packet. If a reply is not received, Dell Networking OS repeats the request three times. These packets are counted in encapsulation failed.
Rcvd:	
...short packets	The number of bytes in the packet are too small.
...bad length	The length of the packet was not correct.
...no port broadcasts	The incoming broadcast/multicast packet did not have any listener.
...socket full	The applications buffer is full and the incoming packet are dropped.

The Dell Monitoring MIB provides access to the following statistics.

- **IP Statistics: Bcast: Received:** Object = f10BcastPktRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.1
- **IP Statistics: Bcast: Sent:** Object = f10BcastPktSent, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.2
- **IP Statistics: Mcast: Received:** Object = f10McastPktRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.3
- **IP Statistics: Mcast: Sent:** Object = f10McastPktSent, OIDs = 1.3.6.1.4.1.6027.3.3.5.1.4
- **ARP Statistics: Rcvd: Request:** Object = f10ArpReqRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.1

- **ARP Statistics: Rcvd: Replies:** Object = f10ArpReplyRecv, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.3
- **ARP Statistics: Sent: Request:** Object = f10ArpReqSent, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.2
- **ARP Statistics: Sent: Replies:** Object = f10ArpReplySent, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.4
- **ARP Statistics: Sent: Proxy:** Object = f10ArpProxySent, OIDs = 1.3.6.1.4.1.6027.3.3.5.2.5

Example

```
Dell#show ip traffic
Control Processor IP Traffic:

IP statistics:
  Rcvd: 23857 total, 23829 local destination
    0 format errors, 0 checksum errors, 0 bad hop count
    0 unknown protocol, 0 not a gateway
    0 security failures, 0 bad options
  Frags: 0 reassembled, 0 timeouts, 0 too big
    0 fragmented, 0 couldn't fragment
  Bcast: 28 received, 0 sent; Mcast: 0 received, 0 sent
  Sent: 16048 generated, 0 forwarded
    21 encapsulation failed, 0 no route
ICMP statistics:
  Rcvd: 0 format errors, 0 checksum errors, 0 redirects, 0
unreachable
    0 echo, 0 echo reply, 0 mask requests, 0 mask replies, 0
quench
    0 parameter, 0 timestamp, 0 info request, 0 other
  Sent: 0 redirects, 0 unreachable, 0 echo, 0 echo reply
    0 mask requests, 0 mask replies, 0 quench, 0 timestamp
    0 info reply, 0 time exceeded, 0 parameter problem
UDP statistics:
  Rcvd: 0 total, 0 checksum errors, 0 no port
    0 short packets, 0 bad length, 0 no port broadcasts, 0
socket full
  Sent: 0 total, 0 forwarded broadcasts
TCP statistics:
  Rcvd: 23829 total, 0 checksum errors, 0 no port
  Sent: 16048 total
ARP statistics:
  Rcvd: 156 requests, 11 replies
  Sent: 21 requests, 10 replies (0 proxy)
Routing Processor1 IP Traffic:
```

show tcp statistics

View information on TCP traffic through the switch.

S6000

Syntax

```
show tcp statistics {all | cp | rp1 | rp2}
```

Parameters

all	Enter the keyword all to view `all` TCP information.

cp	Enter the keyword `cp` to view only TCP information from the Control Processor.
rp1	Enter the keyword `rp1` to view only TCP statistics from Route Processor 1.
rp2	Enter the keyword `rp2` to view only TCP statistics from Route Processor 2.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 6.4.1.0	Introduced

Usage Information

The following describes the `show tcp statistics cp` command shown in the following example.

Field	Description
Rcvd:	Displays the number and types of TCP packets received by the switch. • Total = total packets received • no port = number of packets received with no designated port
0 checksum error...	Displays the number of packets received with the following: • checksum errors • bad offset to data • too short
329 packets...	Displays the number of packets and bytes received in sequence.
17 dup...	Displays the number of duplicate packets and bytes received.

Field	Description
0 partially...	Displays the number of partially duplicated packets and bytes received.
7 out-of-order...	Displays the number of packets and bytes received out of order.
0 packets with data after window	Displays the number of packets and bytes received that exceed the switch’s window size.
0 packets after close	Displays the number of packet received after the TCP connection was closed.
0 window probe packets...	Displays the number of window probe and update packets received.
41 dup ack...	Displays the number of duplicate acknowledgement packets and acknowledgement packets with data received.
10184 ack...	Displays the number of acknowledgement packets and bytes received.
Sent:	Displays the total number of TCP packets sent and the number of urgent packets sent.
25 control packets...	Displays the number of control packets sent and the number retransmitted.
11603 data packets...	Displays the number of data packets sent.
24 data packets retransmitted	Displays the number of data packets resent.
355 ack..	Displays the number of acknowledgement packets sent and the number of packet delayed.
0 window probe...	Displays the number of window probe and update packets sent.
7 Connections initiated...	Displays the number of TCP connections initiated, accepted, and established.
14 Connections closed...	Displays the number of TCP connections closed, dropped.
20 Total rxmt...	Displays the number of times the switch tried to re-send data and the number of connections dropped during the TCP retransmit timeout period.
0 Keepalive....	Lists the number of keepalive packets in timeout, the number keepalive probes and the number of TCP connections dropped during keepalive.

Example

```
Dell#show tcp stat cp

Control Processor TCP:
Rcvd: 10585 Total, 0 no port
   0 checksum error, 0 bad offset, 0 too short
   329 packets (1263 bytes) in sequence
   17 dup packets (6 bytes)
   0 partially dup packets (0 bytes)
   7 out-of-order packets (0 bytes)
   0 packets ( 0 bytes) with data after window
   0 packets after close
   0 window probe packets, 41 window update packets
   41 dup ack packets, 0 ack packets with unsend data
   10184 ack packets (12439508 bytes)
Sent: 12007 Total, 0 urgent packets
   25 control packets (including 24 retransmitted)
   11603 data packets (12439677 bytes)
   24 data packets (7638 bytes) retransmitted
   355 ack only packets (41 delayed)
   0 window probe packets, 0 window update packets
   7 Connections initiated, 8 connections accepted, 15
connections established
   14 Connections closed (including 0 dropped, 0 embryonic
dropped)
   20 Total rxmt timeout, 0 connections dropped in rxmt timeout
   0 Keepalive timeout, 0 keepalive probe, 0 Connections
dropped in keepalive
Dell#
```

Related Commands	show ip cam stack-unit — displays the CAM table.

24

IPv6 Basics

IPv6 basic commands are supported on the Dell Networking platform.

NOTE: For information about the Dell Networking operating software version and platform that supports IPv6 in each software feature, refer to the *IPv6 Addressing* chapter of the *Dell Networking OS Configuration Guide*.

cam-ipv6 extended-prefix

Enable LPM partitioning to support IPv6 /65 to /128 route prefixes to be stored in Partition 1.

S6000

Syntax

```
cam-ipv6 extended-prefix <Max-IPv6-prefixes>
```

To remove LPM partitioning configuration, use no cam-ipv6 extended-prefix.

Parameters

Max-IPv6-Prefix	Maximum number of IPv6 prefixes in the mask length of /65 to /128. The possible values are 1024, 2048, and 3072.

Defaults LPM is not partitioned with Partition 1 and therefore /65 to /128 prefixes are not converted to /64 prefixes and are installed and saved in LPM. All the packets for those routes traverse through the default route path.

Command Modes CONFIGURATION

Command History

Version 9.3(0.1)	Introduced on the S6000.

Usage Information You can partition the LPM table to store IPv6 prefixes greater than /64 mask length. Requires reboot of the switch to take effect as the SDK handles this only during its initialization.

show cam-ipv6 extended-prefix

Display the current settings and next-boot settings for cam-ipv6 extended-prefix configuration. Display the cam-ipv6 extended-prefix configuration.

S6000

Syntax

```
show cam-ipv6 extended-prefix
```

Defaults

None

Command Modes

EXEC

EXEC Privilege

Command History

Version 9.3(0.1)	Introduced on the S6000.

Usage Information

You can use this command to view the number of supported extended prefix entries in LPM configured. The output also displays the current applied value and the new value that is applicable after the reboot of the device.

Example

```
Dell(conf)#do show cam-ipv6 extended-prefix
Cam-Ipv6-LPM Extended Prefix
--------------------------------
Current Settings
cam-ipv6-max-/65-to-/128-Prefix : 2048
Dell(conf)#
```

ipv6 unicast-host-route

Enable programming of IPv6 /128 route prefixes in L3 host table.

S6000

Syntax

```
[no] ipv6 unicast-host-route
```

Defaults

Enabled by default. By default, all the IPv6/128 route prefixes are installed only in L3 host table.

Command Modes

CONFIGURATION

Command History

Version 9.3(0.1)	Introduced on the S6000.

Usage Information

You can use this command to enable programming of /128 route prefixes in L3 host table or in LPM table. A warning message is displayed when you enter this command stating that this setting takes effect for existing routes only when IPv6 route prefixes are cleared from the routing table (RTM). To enable programming of /128 route prefixes in LPM table, use no ipv6 unicast-host-route command.

Example

```
Dell(conf)# ipv6 unicast-host-route
Warning: Command will take effect for existing routes only
```

```
when IPv6
route prefixes are cleared from RTM
Dell(conf)#no ipv6 unicast-host-route
Warning: Command will take effect for existing routes only
when IPv6
route prefixes are cleared from RTM
Dell(conf)#
```

ipv6 nd dns-server

Configures Recursive DNS Server (RDNSS) addresses to be distributed via IPv6 router advertisements to an IPv6 device.

Syntax

`ipv6 nd dns-server {`*`ipv6-RDNSS-address`*`} {`*`lifetime`*` | infinite}`

To remove the IPv6 RDSS configuration, use `no ipv6 nd dns-server {`*`ipv6-RDNSS-address`*`} {`*`lifetime`*` | infinite}`

Parameters

ipv6-RDNSS-address	Enter the IPv6 Recursive DNS Server's (RDNSS) address. You can specify up to 4 IPv6 RDNSS server addresses.
lifetime	Enter the lifetime in seconds. The amount of time the IPv6 host can use the IPv6 RDNSS address for name resolution. The range is `0` to `4294967295` seconds. When you specify the maximum lifetime value of `4294967295` or `infinite`, the lifetime does not expire. A value of `0` indicates to the host that the RDNSS address should not be used. You must specify a lifetime using the `lifetime` or `infinite` parameter.
infinite	Enter the keyword `infinite` to specify that the RDNSS lifetime does not expire.

Defaults

Not Configured

Command Modes

INTERFACE CONFIG

Command History

Version 9.5(0.0)	Added support for roles on the Z9000. Added support for roles on the S6000. Added support for roles on the S4820T. Added support for roles on the S4810. Added support for roles on the MXL.

Usage Information	Use this command to add, edit, or delete an IPv6 RDNSS address and lifetime value. You can configure up to four IPv6 RDNSS addresses. You must specify a lifetime using the lifetime or infinite parameter.
Example	`Dell(conf-if-te-0/1)#ipv6 nd dns-server 1000::1 1`

25

IPv6 Access Control Lists (IPv6 ACLs)

IPv6 ACLs and IPv6 Route Map commands are supported on Dell Networking platform.

NOTE: For IPv4 ACL commands, refer to the Access Control Lists (ACL) chapter.

Important Points to Remember

- Certain platforms require manual CAM usage space allotment. For more information, refer to the cam-acl command.
- Egress IPv6 ACL and IPv6 ACL on the Loopback interface is not supported.
- Reference to an empty ACL permits any traffic.
- ACLs are not applied to self-originated traffic (for example, Control Protocol traffic not affected by IPv6 ACL because the routed bit is not set for Control Protocol traffic and for egress ACLs the routed bit must be set).
- You can use the same access list name for both IPv4 and IPv6 ACLs.
- You can apply both IPv4 and IPv6 ACLs on an interface at the same time.
- You can apply IPv6 ACLs on physical interfaces and a logical interfaces (Port-channel/VLAN).
- Non-contiguous masks are not supported in source or destination addresses in IPv6 ACL entries.
- Because the prefix mask is specified in /x format in IPv6 ACLs, inverse mask is not supported.

show cam-acl-egress

Show information on FP groups allocated for egress ACLs.

S6000

Syntax

```
show cam-acl-egress
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.2.1	Introduced on the S-Series.
Version 8.4.2.0	Introduced on the E-Series TeraScale.
Version 7.8.1.0	Introduced on the C-Series.

Example

```
Dell#show cam-acl-egress

-- Chassis Egress Cam ACL --
         Current Settings(in block sizes)
L2Acl    :         1
Ipv4Acl  :         1
Ipv6Acl  :         2

-- Stack unit 0 --
         Current Settings(in block sizes)
L2Acl    :         1
Ipv4Acl  :         1
Ipv6Acl  :         2

Dell#show cam-acl
```

Related Commands

cam-acl — configures CAM profiles to support IPv6 ACLs.

show cam-acl

Show space allocated for IPv6 ACLs.

S6000

Syntax

`show cam-acl`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.

Version 8.4.2.1	Introduced on the S-Series.
Version 8.4.2.0	Introduced on the E-Series TeraScale.
Version 7.8.1.0	Introduced on the C-Series.

Example

```
show cam-acl (non default)
Dell(conf)#cam-acl l2acl 2 ipv4acl 4 ipv6acl 4 ipv4qos 2 l2qos
1 l2pt 0 ipmacacl 0 vman-qos 0 ecfmacl  0
Dell#show cam-acl

-- Chassis Cam ACL --
             Current Settings(in block sizes)
                   1 block = 128 entries
L2Acl        :        2
Ipv4Acl      :        4
Ipv6Acl      :        4
Ipv4Qos      :        2
L2Qos        :        1
L2PT         :        0
IpMacAcl     :        0
VmanQos      :        0
VmanDualQos  :        0
EcfmAcl      :        0
FcoeAcl      :        0
iscsiOptAcl  :        0
ipv4pbr      :        0
vrfv4Acl     :        0
Openflow     :        0
fedgovacl    :        F3940

-- stack-unit 0 --
           Current Settings(in block sizes)
                   1 block = 128 entries
L2Acl        :        2
Ipv4Acl      :        4
Ipv6Acl      :        4
Ipv4Qos      :        2
L2Qos        :        1
L2PT         :        0+F394
IpMacAcl     :        0
VmanQos      :        0
VmanDualQos  :        0
EcfmAcl      :        0
FcoeAcl      :        0
iscsiOptAcl  :        0
ipv4pbr      :        0
vrfv4Acl     :        0
Openflow     :        0
fedgovacl    :        0

Dell#
```

Example (Manual Profiles)

```
Dell#show cam-acl

-- Chassis Cam ACL --
         Current Settings(in block sizes)
L2Acl   :        2
Ipv4Acl :        2
Ipv6Acl :        4
Ipv4Qos :        2
L2Qos   :        3
```

```
-- Line card 4 --
          Current Settings(in block sizes)
L2Acl   :        2
Ipv4Acl :        2
Ipv6Acl :        4
Ipv4Qos :        2
L2Qos   :        3

Dell#show cam-acl
```

Related Commands

cam-acl — configures CAM profiles to support IPv6 ACLs.

permit icmp

To allow all or specific internet control message protocol (ICMP) messages, configure a filter.

S6000

Syntax

`permit icmp {`*`source address mask`*` | any | host `*`ipv6-address`*`} {`*`destination address`*` | any | host `*`ipv6-address`*`} [count [byte]]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit icmp {`*`source address mask`*` | any | host `*`ipv6-address`*`} {`*`destination address`*` | any | host `*`ipv6-address`*`}` command.

`permit icmp {`*`source address mask`*` | any | host `*`ipv6-address`*`} {`*`destination address`*` | any | host `*`ipv6-address`*`} [`*`message-type`*`] [count [byte]] | [log] [monitor]`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- Use the `no permit icmp {`*`source address mask`*` | any | host `*`ipv6-address`*`} {`*`destination address`*` | any | host `*`ipv6-address`*`}` command.

Parameters

Defaults

Not configured.

Command Modes

ACCESS-LIST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.2.1	Introduced on the S-Series.
Version 8.2.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series TeraScale. Added the `monitor` option.

permit

To configure a filter that matches the filter criteria, select an IPv6 protocol number, ICMP, IPv6, TCP, or UDP.

S6000

Syntax `permit {`*`ipv6-protocol-number`*` | icmp | ipv6 | tcp | udp}`

To remove this filter, you have two choices:

- Use the `no seq sequence-number` command syntax if you know the filter's sequence number
- Use the `no permit {`*`ipv6-protocol-number`*` | icmp | ipv6 | tcp | udp}` command

Parameters

ip-protocol-number	Enter an IPv6 protocol number. The range is from 0 to 255.
icmp	Enter the keyword `icmp` to filter internet Control Message Protocol version 6.
ipv6	Enter the keyword `ipv6` to filter any internet Protocol version 6.
tcp	Enter the keyword `tcp` to filter the Transmission Control protocol.
udp	Enter the keyword `udp` to filter the User Datagram Protocol.

Defaults Not configured.

Command Modes ACCESS-LIST

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.

ipv6 control-plane egress-filter

Enable egress Layer 3 ACL lookup for IPv6 CPU traffic.

S6000

Syntax	`ipv6 control-plane egress-filter`
Defaults	Not enabled.
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.10.0	Introduced on the S4810.

ipv6 access-list

Configure an access list based on IPv6 addresses or protocols.

S6000

Syntax

```
ipv6 access-list access-list-name cpu-qos {permit | deny}
ospfv3
```

To delete an access list, use the `no ipv6 access-list` *`access-list-name`* command.

Parameters

access-list-name	Enter the access list name as a string, up to 140 characters.
cpu-qos	Enter the keyword `cpu-qos` to assign this ACL to control plane traffic only (CoPP).
permit	Enter the keyword `permit` to configure a filter to forward packets meeting this condition.
deny	Enter the keyword `deny` to configure a filter to drop packets meeting this condition.
ospfv3	Specify that this ACL is for OSPFv3 control plane traffic

Defaults

All access lists contain an implicit "deny any"; that is, if no match occurs, the packet is dropped.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for CoPP for OSPFv3 on the S4810, S4820T, S6000, and Z9000 platforms.
Version 9.0.2.0	Introduced on the S6000
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.2.1	Introduced on the S-Series.
Version 8.2.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series. Increased the name string to accept up to 140 characters. Prior to version 7.8.1.0, names are up to 16 characters long.
Version 7.4.1.0	Introduced on the E-Series TeraScale.

Usage Information

The number of entries allowed per ACL is hardware-dependent. For detailed specification on entries allowed per ACL, refer to your line card documentation. You can create an IPv6 ACL for control-plane traffic policing for OSPFv3, in addition to the CoPP support for VRRP, BGP, and ICMP.

cam-acl-egress

Allocate space for IPv6 egress ACLs.

S6000

Syntax	`cam-acl-egress {default	l2acl 1-4 ipv4acl 1-4 ipv6acl 0-4}`

Parameters

default	Use the default CAM profile settings, and set the CAM as follows: • L2 ACL(l2acl): **1** • L3 ACL (ipv4acl: **1** • IPv6 L3 ACL (ipv6acl): **2**
l2acl *1-4* **ipv4acl** *1- 4* **ipv6acl** *0-4*	Allocate space to support IPv6 ACLs. Enter all of the profiles and a range. Enter the CAM profile name then the amount to be allotted. The total space allocated must equal 4. The `ipv6acl` range must be a factor of 2.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.2.0	Introduced on the E-Series TeraScale.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.8.1.0	Introduced on the C-Series.

Usage Information

For the new settings to take effect, save the new CAM settings to the startup-config (`write-mem` or `copy run start`), then reload the system.

The total amount of space allowed is 4 FP Blocks.

Example

```
Dell#
Dell#configure
Dell(conf)#cam-acl-egress ?
default      Reset Egress CAM ACL entries to default setting
l2acl        Set L2-ACL entries
Dell(conf)#cam-acl-egress l2acl ?
```

```
<1-4>          Number of FP blocks for l2acl
Dell(conf)#cam-acl-egress l2acl 1 ?
ipv4acl        Set IPV4-ACL entries
Dell(conf)#cam-acl-egress l2acl 1 ipv4acl 1 ?
ipv6acl        Set IPV6-ACL entries
Dell(conf)#cam-acl-egress l2acl 1 ipv4acl 1 ipv6acl ?
<0-4>          Number of FP blocks for IPV6 (multiples of 2)
Dell(conf)#cam-acl-egress l2acl 1 ipv4acl 1 ipv6acl 2
```

cam-acl

Allocate space for IPv6 ACLs.

S6000

Syntax

`cam-acl {default | l2acl` *`1-10`* `ipv4acl` *`1-10`* `ipv6acl` *`0-10`* `ipv4qos` *`1-10`* `l2qos` *`1-10`*`}`

Parameters

default	Use the default CAM profile settings, and set the CAM as follows: • L3 ACL (ipv4acl): **6** • L2 ACL(l2acl): **5** • IPv6 L3 ACL (ipv6acl): **0** • L3 QoS (ipv4qos): **1** • L2 QoS (l2qos): **1**
l2acl *1-10* **ipv4acl** *1-10* **ipv6acl** *0-10* **ipv4qos** *1-10* **l2qos** *1-10*	Allocate space to support IPv6 ACLs. Enter all of the profiles and a range. Enter the CAM profile name then the amount to be allotted. The total space allocated must equal 13. The `ipv6acl` range must be a factor of 2.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.4.2.0	Introduced on the E-Series TeraScale.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.8.1.0	Introduced on the C-Series.

Usage Information

For the new settings to take effect, save the new CAM settings to the startup-config (`write-mem` or `copy run start`), then reload the system.

The total amount of space allowed is 16 FP blocks. System flow requires three blocks and these blocks cannot be reallocated.

When configuring space for IPv6 ACLs, the total number of Blocks must equal 13.

Ranges for the CAM profiles are from 1 to 10, except for the `ipv6acl profile` which is from 0 to 10. The ipv6acl allocation must be a factor of 2 (2, 4, 6, 8, 10).

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Intermediate System to Intermediate System (IS-IS)

The intermediate system to intermediate system (IS-IS) protocol for IPv4 and IPv6 is supported on the S6000platform.

IS-IS is an interior gateway protocol that uses a shortest-path-first algorithm. IS-IS facilitates the communication between open systems, supporting routers passing both IP and OSI traffic.

A router is considered an intermediate system. Networks are partitioned into manageable routing domains, called areas. Intermediate systems send, receive, and forward packets to other routers within their area (Level 1 and Level 1-2 devices). Only Level 1-2 and Level 2 devices communicate with other areas.

IS-IS protocol standards are listed in the Standard Compliance chapter in the *Dell Networking OS Configuration Guide*.

NOTE: The fundamental mechanisms of IS-IS are the same between IPv4 and IPv6. Where there are differences between the two versions, they are identified and clarified in this chapter. Except where identified, the information in this chapter applies to both protocol versions.

adjacency-check

Verify that the “protocols supported” field of the IS-IS neighbor contains matching values to this router.

S6000

Syntax

`adjacency-check`

To disable adjacency check, use the `no adjacency-check` command.

Defaults

Enabled.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Introduced on the E-Series.

Usage Information

To perform protocol-support consistency checks on hello packets, use this command. The adjacency-check is enabled by default.

advertise

Leak routes between levels (distribute IP prefixes between Level 1 and Level 2 and vice versa).

S6000

Syntax

`advertise {level1-into-level2 | level2-into-level1} *prefix-list-name*`

To return to the default, use the `no advertise {level1-into-level2 | level2-into-level1}[*prefix-list-name*]` command.

Parameters

level1-into-level2	Enter the keywords `level1-into-level2` to advertise Level 1 routes into Level 2 LSPs. This setting is the default.
level2-into-level1	Enter the keywords `level2-into-level1` to advertise Level 2 inter-area routes into Level 1 LSPs. This behavior is described in RFC 2966.
prefix-list-name	Enter the name of a configured IP prefix list. Routes meeting the criteria of the IP Prefix list are leaked.

Defaults

level1-into-level2 (Level 1 to Level 2 leaking enabled.)

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Added IPv6 ISIS support.
Version 6.3.1.0	Version 6.3.1.0 Introduced

Usage Information

You cannot disable leaking from one level to another; however, you can regulate the rate flow from one level to another using an IP Prefix list. If you do not configure the IP Prefix list, all routes are leaked.

You can find more information in IETF RFC 2966, *Domain-wide Prefix Distribution with Two-Level IS-IS*.

area-password

Configure a hash message authentication code (HMAC) password for an area.

S6000

Syntax

```
area-password [hmac-md5 | encryption-type] password
```

To delete a password, use the `no area-password` command.

Parameters

hmac-md5	(OPTIONAL) Enter the keywords `hmac-md5` to encrypt the password.
encryption-type	(OPTIONAL) Enter `7` to encrypt the password using DES.
password	Enter a 1 to 16-character length alphanumeric string to prevent unauthorized access or incorrect routing information corrupting the link state database. The password is processed as plain text, which only provides limited security.

Defaults

Not configured.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

To prevent the link state database from receiving incorrect routing information from unauthorized routers, use the `area-password` command on routers within an area.

The configured password injects into Level 1 LSPs, CSNPs, and PSNPs.

Related Commands

- domain-password — allows you to set the authentication password for a routing domain.
- isis password — allows you to configure an authentication password for an interface.

clear config

Clear IS-IS configurations that display under the *router isis* heading of the `show running-config` command output.

S6000

Syntax

```
clear config
```

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.

Usage Information

⚠ **CAUTION: Use caution when you enter this command. Back up your configuration prior to using this command or your IS-IS configuration will be erased.**

clear isis

Restart the IS-IS process. All IS-IS data is cleared.

S6000

Syntax `clear isis [tag] {* | database | traffic}`

Parameters

tag	(Optional) Enter an alphanumeric string to specify the IS-IS routing tag area.
*	Enter the keyword `*` to clear all IS-IS information and restart the IS-IS process. This command removes IS-IS neighbor information and IS-IS LSP database information and the full SPF calculation is done.
database	Clears IS-IS LSP database information.
traffic	Clears IS-IS counters.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

clns host

Define a name-to-network service mapping point (NSAP) that you use with commands that require NSAPs and system IDs.

S6000

Syntax `clns host name nsap`

Parameters

name	Enter an alphanumeric string to identify the name-to-NSAP mapping.

nsap	Enter a specific NSAP address that is associated with the name parameter.

Defaults	Not configured.
Command Modes	ROUTER ISIS
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information	To configure a shortcut name that you can use instead of entering a long string of numbers associated with an NSAP address, use this command.
Related Commands	hostname dynamic — enables dynamic learning of host names from routers in the domain and allows the routers to advertise the host names in LSPs.

debug isis

Enable debugging for all IS-IS operations.

S6000

Syntax

```
debug isis
```

To disable debugging of IS-IS, use the `no debug isis` command.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *FTOS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

Entering `debug isis` enables all debugging parameters.

To display all debugging information in one output, use this command. To turn off debugging, you normally enter separate `no` forms of each command. To disable all debug messages for IS-IS at once, enter the `no debug isis` command.

debug isis adj-packets

Enable debugging on adjacency-related activity such as hello packets that are sent and received on IS-IS adjacencies.

S6000

Syntax

```
debug isis adj-packets [interface]
```

To turn off debugging, use the `no debug isis adj-packets [interface]` command.

Parameters

interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

debug isis local-updates

To debug IS-IS local update packets, enable debugging on a specific interface and provides diagnostic information.

S6000

Syntax

`debug isis local-updates [`*`interface`*`]`

To turn off debugging, use the `no debug isis local-updates [`*`interface`*`]` command.

Parameters

interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810.
Version 6.3.1.0	Introduced.

debug isis snp-packets

To debug IS-IS complete sequence number PDU (CSNP) and partial sequence number PDU (PSNP) packets, enable debugging on a specific interface and provides diagnostic information.

S6000

Syntax

`debug isis snp-packets [`*`interface`*`]`

To turn off debugging, use the `no debug isis snp-packets [`*`interface`*`]` command.

Parameters

interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 6.3.1.0	Introduced.

debug isis spf-triggers

Enable debugging on the events that triggered IS-IS shortest path first (SPF) events for debugging purposes.

S6000

Syntax

`debug isis spf-triggers`

To turn off debugging, use the `no debug isis spf-triggers` command.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 6.3.1.0	Introduced.

debug isis update-packets

Enable debugging on link state PDUs (LSPs) that a router detects.

S6000

Syntax

`debug isis update-packets [interface]`

To turn off debugging, use the `no debug isis update-packets [interface]` command.

Parameters

interface	(OPTIONAL) Identifies the interface type slot/port as one of the following:

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 6.3.1.0	Introduced.

default-information originate

Generates a default route into an IS-IS routing domain and controls the distribution of default information.

S6000

Syntax

`default-information originate [always] [metric metric] [route-map map-name]`

To disable the generation of a default route into the specified IS-IS routing domain, use the `no default-information originate [always] [metric metric] [route-map map-name]` command.

Parameters

always	(OPTIONAL) Enter the keyword `always` to have the default route always advertised.
metric *metric*	(OPTIONAL) Enter the keyword `metric` then a number to assign to the route. The range is from 0 to 16777215.

route-map *map-name*	(OPTIONAL) A default route the routing process generates if the route map is satisfied.

Defaults	Not configured.
Command Modes	- ROUTER ISIS (for IPv4) - CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (for IPv6)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Added IPv6 ISIS support.
Version 6.3.1.0	Introduced.

Usage Information

When you use this command to redistribute routes into a routing domain, the router becomes an autonomous system (AS) boundary router. An AS boundary router does not always generate a default route into a routing domain. The router still requires its own default route before it can generate one.

How a metric value assigned to a default route advertises depends on the `metric-style` command configuration. If the `metric-style` command is set for Narrow mode and the metric value in the `default-information originate` command is set to a number higher than 63, the metric value advertised in the LSPs is 63. If the `metric-style` command is set for Wide mode, the metric value in the `default-information originate` command is advertised.

Related Commands

- redistribute — redistributes routes from one routing domain to another routing domain.
- isis metric — configures a metric for an interface.
- metric-style — sets the metric style for the router.
- show isis database — displays the IS-IS link state database.

description

Enter a description of the IS-IS routing protocol.

S6000

Syntax

`description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the IS-IS protocol (80 characters maximum).

Defaults

none

Command Modes

ROUTER ISIS

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
pre-7.7.1.0	Introduced.

Related Commands

router isis — Enter ROUTER mode on the switch.

distance

Define the administrative distance for learned routes.

S6000

Syntax

`distance weight [ip-address mask [prefix-list]]`

To return to the default values, use the `no distance weight` command.

Parameters

weight	The administrative distance value indicates the reliability of a routing information source. The range is from 1 to 255. (A higher relative value indicates lower reliability. Routes with smaller values are given preference.) The default is **115**.

ip-address mask	(OPTIONAL) Enter an IP address in dotted decimal format and enter a mask in either dotted decimal or /prefix format.
prefix-list	(OPTIONAL) Enter the name of a prefix list name.

Defaults

weight = **115**

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 6.3.1.0	Introduced.

Usage Information

The administrative distance indicates the trust value of incoming packets. A low administrative distance indicates a high trust rate. A high value indicates a lower trust rate. For example, a weight of 255 is interpreted that the routing information source is not trustworthy and should be ignored.

distribute-list in

Filter network prefixes received in updates.

S6000

Syntax

`distribute-list prefix-list-name in [interface]`

To return to the default values, use the `no distribute-list prefix-list-name in [interface]` command.

Parameters

prefix-list-name	Specify the prefix list to filter prefixes in routing updates.
interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

- For a 1- Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a SONET interface, enter the keyword `sonet` then the slot/port information.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 7.5.1.0	Added IPv6 ISIS support.
Version 6.3.1.0	Introduced.

Related Commands

- distribute-list out — suppresses networks from being advertised in updates.
- redistribute — redistributes routes from one routing domain to another routing domain.

distribute-list out

Suppress network prefixes from being advertised in outbound updates.

S6000

Syntax

```
distribute-list prefix-list-name out [connected | bgp as number
| ospf process-id | rip | static]
```

To return to the default values, use the `no distribute-list` *`prefix-list-name`* `out [bgp` *`as number`* `connected | ospf` *`process-id`* `| rip | static]` command.

Parameters

prefix-list-name	Specify the prefix list to filter prefixes in routing updates.
connected	(OPTIONAL) Enter the keyword `connected` for directly connected routing process.
ospf *process-id*	(OPTIONAL) Enter the keyword `ospf` then the OSPF process-ID number. The range is from 1 to 65535.
bgp *as number*	(OPTIONAL) Enter the BGP then the AS Number. The range is from 1 to 65535.
rip	(OPTIONAL) Enter the keyword `rip` for RIP routes.
static	(OPTIONAL) Enter the keyword `static` for user-configured routing process.

Defaults

Not configured.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 7.5.1.0	Added IPv6 ISIS support.
Version 6.3.1.0	Introduced.

Usage Information

You can assign a name to a routing process so a prefix list IS applied to only the routes derived from the specified routing process.

Related Commands

- distribute-list in — filters the networks received in updates.
- redistribute — redistributes routes from one routing domain to another routing domain.

distribute-list redistributed-override

Suppress flapping of routes when the same route is redistributed into IS-IS from multiple routers in the network.

S6000

Syntax	`distribute-list redistributed-override in` To return to the default, use the `no distribute-list redistributed-override in` command.
Defaults	none
Command Modes	• ROUTER ISIS (*for IPv4*) • CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.8.1.0	Added IPv6 ISIS support.
Version 6.3.1.0	Introduced.

Usage Information	When you execute this command, IS-IS does not download the route to the routing table if the same route was redistributed into IS-IS routing protocol on the same router.

domain-password

Set the authentication password for a routing domain.

S6000

Syntax	`domain-password [hmac-md5	encryption-type] password` To disable the password, use the `no domain-password` command.

Parameters

hmac-md5	(OPTIONAL) Enter the keywords `hmac-md5` to encrypt the password using MD5.
encryption-type	(OPTIONAL) Enter `7` to encrypt the password using DES.
password	Enter an alphanumeric string up to 16 characters long. If you do not specify an `encryption type` or `hmac-md5` keywords, the password is processed as plain text which provides limited security.

Defaults

No default password.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 6.3.1.0	Introduced.

Usage Information

The domain password is inserted in Level 2 link state PDUs (LSPs), complete sequence number PDUs (CSNPs), and partial sequence number PDUs (PSNPs).

Related Commands

- area-password — configures an IS-IS area authentication password.
- isis priority — configures the authentication password for an interface.

graceful-restart ietf

Enable graceful restart on an IS-IS router.

S6000

Syntax

```
graceful-restart ietf
```

To return to the default, use the `no graceful-restart ietf` command.

Parameters	**ietf** Enter `ietf` to enable graceful restart on the IS-IS router.
Defaults	Graceful restart disabled.
Command Modes	ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 6.3.1.0	Introduced on the E-Series.

Usage Information

Every graceful restart enabled router's HELLO PDUs includes a restart TLV. This restart enables (re)starting as well as the existing ISIS peers to detect the GR capability of the routers on the connected network. A flag in the Restart TLV contains restart request (RR), restart acknowledge (RA) and suppress adjacency advertisement (SA) bit flags.

The ISIS graceful restart-enabled router can co-exist in mixed topologies where some routers are graceful restart-enabled and others are not. For neighbors that are not graceful restart-enabled, the restarting router brings up the adjacency per the usual methods.

graceful-restart interval

Set the graceful restart grace period, the time during that all graceful restart attempts are prevented.

S6000

Syntax

```
graceful-restart interval minutes
```

To return to the default, use the `no graceful-restart interval` command.

Parameters

minutes	Enter the graceful-restart interval minutes. The range is from 1 to 20 minutes. The default is **5 minutes**.

Defaults **5 minutes**

Command Modes ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced on the E-Series.

graceful-restart restart-wait

Enable the graceful restart maximum wait time before a restarting peer comes up.

S6000

Syntax

NOTE: Set the t3 timer to `adjacency` on the restarting router when implementing this command.

`graceful-restart restart-wait *seconds*`

To return to the default, use the `no graceful-restart restart-wait` command.

Parameters

seconds	Enter the graceful restart time in seconds. The range is from 5 to 300 seconds. The default is **30 seconds**.

Defaults **30 seconds**

Command Modes ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced on the E-Series.

Related Commands

graceful-restart t3 — configures the overall wait time before graceful restart completes.

graceful-restart t1

Set the graceful restart wait time before unacknowledged restart requests are generated. This wait time is the interval before the system sends a restart request (an IIH with RR bit set in Restart TLV) until the CSNP is received from the helping router.

S6000

Syntax

`graceful-restart t1 {interval seconds | retry-times value}`

To return to the default, use the `no graceful-restart t1` command.

Parameters

interval	Enter the keyword `interval` to set the wait time. The range is from 5 to 120 seconds. The default is **5 seconds**.
retry-times	Enter the keywords `retry-times` to set the number of times the request interval is extended until a CSNP is received from the helping router. The range is from 1 to 10 attempts. The default is **1**.

Defaults

Refer to Parameters.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced on the E-Series.

graceful-restart t2

Configure the wait time for the graceful restart timer T2 that a restarting router uses as the wait time for each database to synchronize.

S6000

Syntax

`graceful-restart t2 {level-1 | level-2} seconds`

To return to the default, use the `no graceful-restart t2` command.

Parameters

level-1, level-2	Enter the keywords `level-1` or `level-2` to identify the database instance type to which the wait interval applies.
seconds	Enter the `gracefule-restart t2` time in seconds. The range is from 5 to 120 seconds. The default is **30 seconds**.

Defaults

30 seconds

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced on the E-Series.

graceful-restart t3

Configure the overall wait time before graceful restart completes.

S6000

Syntax

`graceful-restart t3 {adjacency | manual} *seconds*`

To return to the default, use the `no graceful-restart t3` command.

Parameters

adjacency	Enter the keyword `adjacency` so that the restarting router receives the remaining time value from its peer and adjusts its T3 value so if you have configured this option.
manual	Enter the keyword `manual` to specify a time value that the restarting router uses. The range is from 50 to 120 seconds. The default is **30 seconds**.

Defaults

manual, **30 seconds**

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced on the E-Series.

Usage Information

The running router sets the remaining time value to the current adjacency hold time. You can override this setting by implementing this command.

Override the default restart-wait time by entering the `no graceful-restart restart-wait` command. When you disable `restart-wait`, the current adjacency hold time is used.

Set the t3 timer to `adjacency` on the restarting router when implementing this command. The restarting router gets the remaining time value from its peer and adjusts its T3 value so only when you have configured `graceful-restart t3 adjacency`.

Related Commands	graceful-restart restart-wait — enables the graceful restart maximum wait time before a restarting peer comes up.

hello padding

Use to turn ON or OFF padding for LAN and point-to-point hello PDUs or to selectively turn padding ON or OFF for LAN or point-to-point hello PDUs.

S6000

Syntax

```
hello padding [multi-point | point-to-point]
```

To return to the default, use the `no hello padding [multi-point | point-to-point]` command.

Parameters

multi-point	(OPTIONAL) Enter the keywords `multi-point` to pad only LAN hello PDUs.
point-to-point	(OPTIONAL) Enter the keywords `point-to-point` to pad only point-to-point PDUs.

Defaults	Both LAN and point-to-point hello PDUs are padded.
Command Modes	ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information	IS-IS hellos are padded to the full maximum transmission unit (MTU) size. Padding IS-IS Hellos (IIHS) to the full MTU provides early error detection of large frame transmission problems or mismatched MTUs on adjacent interfaces.
Related Commands	isis hello padding — turns ON or OFF hello padding on an interface basis.

hostname dynamic

Enables dynamic learning of hostnames from routers in the domain and allows the routers to advertise the hostname in LSPs.

S6000

Syntax	`hostname dynamic` To disable this command, use the `no hostname dynamic` command.
Defaults	Enabled.
Command Modes	ROUTER ISIS
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information	To build name-to-systemID mapping tables through the protocol, use this command. All `show` commands that display systems also display the hostname.
Related Commands	clns host — defines a name-to-NSAP mapping.

ignore-lsp-errors

Ignore LSPs with bad checksums instead of purging those LSPs.

S6000

Syntax	`ignore-lsp-errors` To return to the default values, use the `no ignore-lsp-errors` command.
Defaults	In IS-IS, the default deletes LSPs with internal checksum errors (`no ignore-lsp-errors`).

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information IS-IS normally purges LSPs with an incorrect data link checksum causing the LSP source to regenerate the message. A cycle of purging and regenerating LSPs can occur when a network link continues to deliver accurate LSPs even though there is a link causing data corruption. This process could cause disruption to your system operation.

ip router isis

Configure IS-IS routing processes on an interface and attach an area tag name to the routing process.

S6000

Syntax `ip router isis [tag]`

To disable IS-IS on an interface, use the `no ip router isis [tag]` command.

Parameters

tag	(OPTIONAL) The tag you specify identifies a specific area routing process. If you do not specify a tag, a null tag is assigned.

Defaults No processes are configured.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Introduced.

Usage Information

To assign a network entity title to enable IS-IS, use the `net` command.

Related Commands

- net — configures an IS-IS network entity title (NET) for the routing process.
- router isis — enables the IS-IS routing protocol.

ipv6 router isis

Enable the IPv6 IS-IS routing protocol and specify an IPv6 IS-IS process.

S6000

Syntax

`ipv6 router isis [tag]`

To disable IS-IS routing, use the `no router isis [tag]` command.

Parameters

tag	(OPTIONAL) This parameter is a unique name for a routing process. A null tag is assumed if the tag option is not specified. The tag name must be unique for all IP router processes for a given router.

Defaults

Not configured.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Introduced on the E-Series.

Usage Information

Configure a network entity title (the `net` command) to specify the area address and the router system ID.

To establish adjacencies and establish dynamic routing, enable routing on one or more interfaces.

You can configure only one IS-IS routing process to perform Level 2 routing. A `level-1-2` designation performs Level 1 and Level 2 routing at the same time.

Related Commands

- net — configures an IS-IS network entity title (NET) for the routing process.
- is-type — assigns a type for a given area.

isis circuit-type

Configure the adjacency type on interfaces.

S6000

Syntax

```
isis circuit-type {level-1 | level-1-2 | level-2-only}
```

To return to the default values, use the `no isis circuit-type` command.

Parameters

level-1	You can form a Level 1 adjacency if there is at least one common area address between this system and neighbors. You cannot form Level 2 adjacencies on this interface.
level-1-2	You can form a Level 1 and Level 2 adjacencies when the neighbor is also configured as Level-1-2 and there is at least one common area, if not, a Level 2 adjacency is established. This setting is the default.
level-2-only	You can form a Level 2 adjacencies when other Level 2 or Level 1-2 routers and their interfaces are configured for Level 1-2 or Level 2. Level 1 adjacencies cannot be established on this interface.

Defaults **level-1-2**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

Because the default establishes Level 1 and Level 2 adjacencies, you do not need to configure this command. Routers in an IS-IS system must be configured as a Level 1-only, Level 1-2, or Level 2-only system.

Only configure interfaces as Level 1 or Level 2 on routers that are between areas (for example, a Level 1-2 router) to prevent the software from sending unused hello packets and wasting bandwidth.

isis csnp-interval

Configure the IS-IS complete sequence number PDU (CSNP) interval on an interface.

S6000

Syntax

`isis csnp-interval seconds [level-1 | level-2]`

To return to the default values, use the `no isis csnp-interval [seconds] [level-1 | level-2]` command.

Parameters

seconds	Interval of transmission time between CSNPs on multi-access networks for the designated intermediate system. The range is from 0 to 65535. The default is **10**.
level-1	(OPTIONAL) Independently configures the interval of time between transmission of CSNPs for Level 1.
level-2	(OPTIONAL) Independently configures the interval of time between transmission of CSNPs for Level 2.

Defaults

seconds = **10**; **level-1** (if not otherwise specified)

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

The default values of this command are typically satisfactory transmission times for a specific interface on a designated intermediate system. To maintain database synchronization, the designated routers send CSNPs.

You can configure Level 1 and Level 2 CSNP intervals independently.

isis hello-interval

Specify the length of time between hello packets sent.

S6000

Syntax

`isis hello-interval seconds [level-1 | level-2]`

To return to the default values, use the `no isis hello-interval [seconds] [level-1 | level-2]` command.

Parameters

seconds	Allows you to set the length of time between hello packet transmissions. The range is from 1 to 65535. The default is **10**.
level-1	(OPTIONAL) Select this value to configure the hello interval for Level 1. This value is the default.
level-2	(OPTIONAL) Select this value to configure the hello interval for Level 2.

Defaults

seconds = **10**; **level-1** (if not otherwise specified)

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

Hello packets are held for a length of three times the value of the hello interval. To conserve bandwidth and CPU usage, use a high hello interval seconds. Use a low hello interval seconds for faster convergence (but uses more bandwidth and CPU resources).

Related Commands

isis hello-multiplier — specifies the number of IS-IS hello packets a neighbor must miss before the router declares the adjacency as down.

isis hello-multiplier

Specify the number of IS-IS hello packets a neighbor must miss before the router declares the adjacency down.

S6000

Syntax

`isis hello-multiplier multiplier [level-1 | level-2]`

To return to the default values, use the `no isis hello-multiplier [multiplier] [level-1 | level-2]` command.

Parameters

multiplier	Specifies an integer that sets the multiplier for the hello holding time. Never configure a hello-multiplier lower than the default (3). The range is from 3 to 1000. The default is **3**.
level-1	(OPTIONAL) Select this value to configure the hello multiplier independently for Level 1 adjacencies. This value is the default.
level-2	(OPTONAL) Select this value to configure the hello multiplier independently for Level 2 adjacencies.

Defaults

multiplier = **3**; **level-1** (if not otherwise specified)

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

The holdtime (the product of the hello-multiplier multiplied by the hello-interval) determines how long a neighbor waits for a hello packet before declaring the neighbor is down so routes can be recalculated.

Related Commands

isis hello-interval — specifies the length of time between hello packets.

isis hello padding

Turn ON or OFF padding of hello PDUs from INTERFACE mode.

S6000

Syntax

`isis hello padding`

To return to the default, use the `no isis hello padding` command.

Defaults

Padding of hello PDUs is enabled (ON).

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

Hello PDUs are "padded" only when both the global and interface padding options are ON. Turning either one OFF disables padding for the corresponding interface.

Related Commands	hello padding — turns ON or OFF padding for LAN and point-to-point hello PDUs.

isis ipv6 metric

Assign metric to an interface for use with IPv6 information.

S6000

Syntax

```
isis ipv6 metric default-metric [level-1 | level-2]
```

To return to the default values, use the `no ipv6 isis metric [default-metric] [level-1 | level-2]` command.

Parameters

default-metric	Metric assigned to the link and used to calculate the cost from each other router via the links in the network to other destinations. You can configure this metric for Level 1 or Level 2 routing. The range is from 0 to 16777215. The default is **10**.
level-1	(OPTIONAL) Enter the keywords `level-1` to configure the shortest path first (SPF) calculation for Level 1 (intra-area) routing. This value is the default.
level-2	(OPTIONAL) Enter the keywords `level-2` to configure the SPF calculation for Level 2 (inter-area) routing.

Defaults: default-metric = **10**; **level-1** (if not otherwise specified)

Command Modes: INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Introduced on the E-Series.

Usage Information	Dell Networking recommends configuring metrics on all interfaces. Without configuring this command, the IS-IS metrics are similar to hop-count metrics.

isis metric

Assign a metric to an interface.

S6000

Syntax

`isis metric default-metric [level-1 | level-2]`

To return to the default values, use the `no isis metric [default-metric] [level-1 | level-2]` command.

Parameters

default-metric	Metric assigned to the link and used to calculate the cost from each other router via the links in the network to other destinations. You can configure this metric for Level 1 or Level 2 routing. The range is from 0 to 63 for narrow and transition metric styles and from 0 to 16777215 for wide metric styles. The default is **10**.
level-1	(OPTIONAL) Enter the keywords `level-1` to configure the shortest path first (SPF) calculation for Level 1 (intra-area) routing. This setting is the default.
level-2	(OPTIONAL) Enter the keywords `level-2` to configure the SPF calculation for Level 2 (inter-area) routing.

Defaults	default-metric = **10**; **level-1** (if not otherwise specified)
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information	Dell Networking recommends configuring metrics on all interfaces. Without configuring this command, the IS-IS metrics are similar to hop-count metrics.

isis network point-to-point

Enable the software to treat a broadcast interface as a point-to-point interface.

S6000

Syntax	`isis network point-to-point` To disable the feature, use the `no isis network point-to-point` command.
Defaults	Not enabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

isis password

Configure an authentication password for an interface.

S6000

Syntax	`isis password [hmac-md5]` *`password`* `[level-1 | level-2]` To delete a password, use the `no isis password [`*`password`*`] [level-1 | level-2]` command.

Parameters

encryption-type	(OPTIONAL) Enter `7` to encrypt the password using DES.
hmac-md5	(OPTIONAL) Enter the keywords `hmac-md5` to encrypt the password using MD5.
password	Assign the interface authentication password.
level-1	(OPTIONAL) Independently configures the authentication password for Level 1. The router acts as a station router for Level 1 routing. This setting is the default.
level-2	(OPTIONAL) Independently configures the authentication password for Level 2. The router acts as an area router for Level 2 routing.

Defaults

No default password. **level-1** (if not otherwise specified).

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

To protect your network from unauthorized access, use this command to prevent unauthorized routers from forming adjacencies.

You can assign different passwords for different routing levels by using the keywords `level-1` and `level-2`.

The `no` form of this command disables the password for Level 1 or Level 2 routing, using the respective keywords `level-1` or `level-2`.

This password provides limited security as it is processed as plain text.

isis priority

Set the priority of the designated router you select.

S6000

Syntax `isis priority value [level-1 | level-2]`

To return to the default values, use the `no isis priority [value] [level-1 | level-2]` command.

Parameters

value	This value sets the router priority. The higher the value, the higher the priority. The range is from 0 to 127. The default is **64**.
level-1	(OPTIONAL) Specify the priority for Level 1. This setting is the default.
level-2	(OPTIONAL) Specify the priority for Level 2.

Defaults value = **64**; **level-1** (if not otherwise specified).

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OSCommand Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

You can configure priorities independently for Level 1 and Level 2. Priorities determine which router on a LAN is the designated router. Priorities are advertised within hellos. The router with the highest priority becomes the designated intermediate system (DIS).

NOTE: Routers with a priority of 0 cannot be a designated router.

Setting the priority to 0 lowers the chance of this system becoming the DIS, but does not prevent it. If all the routers have priority 0, one with highest MAC address becomes DIS even though its priority is 0.

is-type

Configure IS-IS operating level for a router.

S6000

Syntax	`is-type {level-1 | level-1-2 | level-2-only}` To return to the default values, use the `no is-type` command.

Parameters

level-1	Allows a router to act as a Level 1 router.
level-1-2	Allows a router to act as both a Level 1 and Level 2 router. This setting is the default.
level-2-only	Allows a router to act as a Level 2 router.

Defaults	**level-1-2**
Command Modes	ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

The IS-IS protocol automatically determines area boundaries and are able to keep Level 1 and Level 2 routing separate. Poorly planned use of this feature may cause configuration errors, such as accidental area partitioning.

If you are configuring only one area in your network, you do not need to run both Level 1 and Level 2 routing algorithms. You can configure the IS type as Level 1.

log-adjacency-changes

Generate a log messages for adjacency state changes.

S6000

Syntax

```
log-adjacency-changes
```

To disable this function, use the `no log-adjacency-changes` command.

Defaults

Adjacency changes are not logged.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

This command allows you to monitor adjacency state changes, which are useful when you monitor large networks. Messages are logged in the system's error message facility.

lsp-gen-interval

Set the minimum interval between successive generations of link-state packets (LSPs).

S6000

Syntax

```
lsp-gen-interval [level-1 | level-2] interval seconds
[initial_wait_interval seconds [second_wait_interval seconds]]
```

To restore default values, use the `no lsp-gen-interval [level-1 | level-2] interval seconds [initial_wait_interval seconds [second_wait_interval seconds]]` command.

Parameters

level-l	(OPTIONAL) Enter the keywords `level-1` to apply the configuration to generation of Level-1 LSPs.

level-2	(OPTIONAL) Enter the keywords `level-2` to apply the configuration to generation of Level-2 LSPs.
interval seconds	Enter the maximum number of seconds between LSP generations. The range is from 0 to 120 seconds. The default is **5 seconds**.
initial_wait_interval seconds	(OPTIONAL) Enter the initial wait time, in seconds, before running the first LSP generation. The range is from 0 to 120 seconds. The default is **1 second**.
second_wait_interval seconds	(OPTIONAL) Enter the wait interval, in seconds, between the first and second LSP generation. The range is from 0 to 120 seconds. The default is **5 seconds**.

Defaults

Refer to *Parameters*.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information

LSP throttling slows down the frequency at which LSPs are generated during network instability. Even though throttling LSP generations slows down network convergence, no throttling can result in a network not functioning as expected. If network topology is unstable, throttling slows down the scheduling of LSP generations until the topology regains its stability.

The first generation is controlled by the initial wait interval and the second generation is controlled by the second wait interval. Each subsequent wait interval is twice as long as the previous one until the wait interval reaches the maximum wait time specified (`interval seconds`). After the network calms down and there are no triggers for two times the maximum interval, fast behavior is restored (the initial wait time).

lsp-mtu

Set the maximum transmission unit (MTU) of IS-IS link-state packets (LSPs). This command only limits the size of LSPs this router generates.

S6000

Syntax	`lsp-mtu size` To return to the default values, use the `no lsp-mtu` command.
Parameters	*size* — The maximum LSP size, in bytes. The range is from 128 to 1497 for Non-Jumbo mode and from 128 to 9195 for Jumbo mode. The default is **1497**.
Defaults	**1497** bytes.
Command Modes	ROUTER ISIS
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information

The link MTU and the LSP MTU size must be the same.

Because each device can generate a maximum of 255 LSPs, consider carefully whether you use the `lsp-mtu` command.

lsp-refresh-interval

Set the link state PDU (LSP) refresh interval. LSPs must be refreshed before they expire. When the LSPs are not refreshed after a refresh interval, they are kept in a database until their `max-lsp-lifetime` reaches zero and then LSPs is purged.

S6000

Syntax	`lsp-refresh-interval` *`seconds`* To restore the default refresh interval, use the `no lsp-refresh-interval` command.
Parameters	*seconds* — The LSP refresh interval, in seconds. This value has to be less than the seconds value specified with the `max-lsp-lifetime` command. The range is from 1 to 65535 seconds. The default is **900**.
Defaults	**900** seconds
Command Modes	ROUTER ISIS
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information	The refresh interval determines the rate at which route topology information is transmitted preventing the information from becoming obsolete. The refresh interval must be less than the LSP lifetime specified with the `max-lsp-lifetime` command. A low value reduces the amount of time that undetected link state database corruption can persist at the cost of increased link utilization. A higher value reduces the link utilization the flooding of refreshed packets causes.
Related Commands	max-lsp-lifetime — sets the maximum interval that LSPs persist without being refreshed.

max-area-addresses

Configure manual area addresses.

S6000

Syntax	`max-area-addresses` *`number`* To return to the default values, use the `no max-area-addresses` command.
Parameters	*number*: Set the maximum number of manual area addresses. The range is from 3 to 6. The default is **3**.
Defaults	**3** addresses
Command Modes	ROUTER ISIS
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.5.1.0	Added support for LSP Throttling Enhancement.

Usage Information	To configure the number of area addresses on router, use this command. This value must be consistent with routers in the same area, otherwise the router forms only Level 2 adjacencies. The value must be same among all the routers to form Level 1 adjacencies.

max-lsp-lifetime

Set the maximum time that link-state packets (LSPs) exist without being refreshed.

S6000

Syntax	`max-lsp-lifetime` *`seconds`* To restore the default time, use the `no max-lsp-lifetime` command.

Parameters

seconds	The maximum lifetime of LSP in seconds. This value must be greater than the `lsp-refresh-interval` command. The higher the value the longer the LSPs are kept. The range is from 1 to 65535. The default is **1200**.

Defaults

1200 seconds

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

Change the maximum LSP lifetime with this command. The maximum LSP lifetime must always be greater than the LSP refresh interval.

The `seconds` parameter enables the router to keep LSPs for the specified length of time. If the value is higher, the overhead is reduced on slower-speed links.

Related Commands

lsp-refresh-interval — sets the link-state packet (LSP) refresh interval.

maximum-paths

Allows you to configure the maximum number of equal cost paths allowed in a routing table.

S6000

Syntax

`maximum-paths number`

To return to the default values, use the `no maximum-paths` command.

Parameters

number	Enter a number as the maximum number of parallel paths an IP routing installs in a routing table. The range is from 1 to 16. The default is **4**.

Defaults	**4**
Command Modes	- ROUTER ISIS (*for IPv4*) - CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.8.1.0	Added support for multi-topology ISIS.
Version 6.3.1.0	Introduced.

metric-style

To generate and accept old-style, new-style, or both styles of type, length, and values (TLV), configure a router.

S6000

Syntax

```
metric-style {narrow [transition] | transition | wide
[transition]} [level-1 | level-2]
```

To return to the default values, use the `no metric-style {narrow [transition] | transition | wide [transition]} [level-1 | level-2]` command.

Parameters

narrow	Allows you to generate and accept old-style TLVs. The metric range is from 0 to 63.
transition	Allows you to generate both old-style and new-style TLVs. The metric range is from 0 to 63.
wide	Allows you to generate and accept only new-style TLVs. The metric range is from 0 to 16777215.
level-1	Enables the metric style on Level 1.
level-2	Enables the metric style on Level 2.

Defaults

narrow; if no Level is specified, Level-1 and Level-2 are configured.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

If you enter the `metric-style wide` command, the Dell Networking OS generates and accepts only new-style TLVs. The router uses less memory and other resources rather than generating both old-style and new-style TLVs.

The new-style TLVs have wider metric fields than old-style TLVs.

Related Commands

isis metric — configures a metric for an interface.

multi-topology

Enables multi-topology IS-IS. It also allows enabling/disabling of old and new style TLVs for IP prefix information in the LSPs.

S6000

Syntax

`multi-topology [transition]`

To return to a single topology configuration, use the `no multi-topology [transition]` command.

Parameters

transition

Defaults

Disabled

Command Modes

CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.8.1.0	Introduced.

net

To configure an IS-IS network entity title (NET) for a routing process, use this mandatory command. If you did not configure a NET, the IS-IS process does not start.

S6000

Syntax `net` *`network-entity-title`*

To remove a net, use the `no net network-entity-title` command.

Parameters

network-entity-title	Specify the area address and system ID for an IS-IS routing process. The first 1 to 13 bytes identify the area address. The next 6 bytes identify the system ID. The last 1 byte is the selector byte, always identified as zero zero (00). This argument can be applied to an address or a name.

Defaults Not configured.

Command Modes ROUTER ISIS

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

passive-interface

Suppress routing updates on an interface. This command stops the router from sending updates on that interface.

S6000

Syntax	`passive-interface` *`interface`* To delete a passive interface configuration, use the `no passive-interface` *`interface`* command.
Parameters	

interface	Enter the following keywords and slot/port or number information: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a SONET interface, enter the keyword `sonet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults	Not configured.
Command Modes	ROUTER ISIS
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information	Although the passive interface does not send nor receive routing updates, the network on that interface is still included in the IS-IS updates sent using other interfaces.

redistribute

Redistribute routes from one routing domain to another routing domain.

S6000

Syntax

`redistribute {static | connected | rip} [level-1 | level-1-2 | level-2] [metric *metric-value*] [metric-type {external | internal}] [route-map *map-name*]`

To end redistribution or disable any of the specified keywords, use the `no redistribute {static | connected | rip} [metric metric-value] [metric-type {external | internal}] [level-1 | level-1-2 | level-2] [route-map map-name]` command.

Parameters

connected	Enter the keyword `connected` to redistribute active routes into IS-IS.
rip	Enter the keyword `rip` to redistribute RIP routes into IS-IS.
static	Enter the keyword `static` to redistribute user-configured routes into IS-IS.
metric *metric-value*	(OPTIONAL) Assign a value to the redistributed route. The range is from 0 to 16777215. The default is **0**. Use a value that is consistent with the destination protocol.
metric-type {external | internal}	(OPTIONAL) The external link type associated with the default route advertised into a routing domain. Specify one of the following: • `external` • `internal`
level-1	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 1 routes.
level-1-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level-1-2 routes.
level-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 2 routes. This setting is the default.
route-map *map-name*	(OPTIONAL) If you do not enter the route-map argument, all routes are redistributed. If a map-name value is not specified, no routers are imported.

Defaults

- metric metric-value = **0**
- metric-type= internal; **level-2**

Command Modes

- ROUTER ISIS (*for IPv4*)

- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.5.1.0	Added support for IPv6 ISIS.
Version 6.3.1.0	Introduced.

Usage Information

To redistribute a default route (0.0.0.0/0), configure the `default-information originate` command.

Changing or disabling a keyword in this command does not affect the state of the other command keywords.

When an LSP with an internal metric is received, the Dell Networking OS considers the route cost while considering the advertised cost to reach the destination.

Redistributed routing information is filtered with the `distribute-list out` command to ensure that the routes are properly are passed to the receiving routing protocol.

How a metric value assigned to a redistributed route is advertised depends on how on the configuration of the `metric-style` command. If the `metric-style` command is set for Narrow or Transition mode and the metric value in the `redistribute` command is set to a number higher than 63, the metric value advertised in LSPs is 63. If the `metric-style` command is set for Wide mode, the metric value in the `redistribute` command is advertised.

Related Commands

- default-information originate — generates a default route for the IS-IS domain.
- distribute-list out — suppresses networks from being advertised in updates. This command filters redistributed routing information.

redistribute bgp

Redistribute routing information from a BGP process.

S6000

Syntax	`redistribute bgp AS number [level-1| level-1-2 | level-2] [metric metric-value] [metric-type {external| internal}] [route-map map-name]` To return to the default values, use the `no redistribute bgp` command with the appropriate parameters.

Parameters

AS number	Enter a number that corresponds to the autonomous system number. The range is from 1 to 65355.
level-1	(OPTIONAL) Routes are independently redistributed into IS-IS Level 1 routes only.
level-1-2	(OPTIONAL) Routes are independently redistributed into IS-IS Level 1 and Level 2 routes.
level-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 2 routes only. This setting is the default.
metric *metric-value*	(OPTIONAL) The value used for the redistributed route. Use a metric value that is consistent with the destination protocol. The range is from 0 to 16777215. The default is **0**.
metric-type {external| internal}	(OPTIONAL) The external link type associated with the default route advertised into a routing domain. The two options are: • `external` • `internal`
route-map *map-name*	`map-name` is an identifier for a configured route map. The route map filters imported routes from the source routing protocol to the current routing protocol. If you do not specify a map-name, all routes are redistributed. If you specify a keyword, but fail to list route map tags, no routes are imported.

Defaults	**IS-IS Level 2** routes only
Command Modes	• ROUTER ISIS (*for IPv4*) • CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.5.1.0	Added support for IPv6 ISIS.
Version 6.3.1.0	Introduced.

Usage Information

BGP to IS-IS redistribution supports “match” options using route maps. You can set the metric value, level, and metric-type of redistributed routes by the redistribution command. You can “set” more advanced options using route maps.

Example

```
FTOS(conf)#router is
FTOS(conf-router_isis)#redistribute bgp 1 level-1 metric 32
metric-type
external route-map rmap-isis-to-bgp
FTOS(conf-router_bgp)#show running-config isis
!
router isis
redistribute bgp 1 level-1 metric 32 metric-type external
route-map
rmap-isis-to-bgp
```

redistribute ospf

Redistribute routing information from an OSPF process.

S6000

Syntax

`redistribute ospf` *`process-id`* `[level-1| level-1-2 | level-2] [match {internal | external}] [metric` *`metric-value`*`] [metric-type {external | internal}] [route-map` *`map-name`*`]`

To return to the default values, use the `no redistribute ospf` *`process-id`* `[level-1| level-1-2 | level-2] [match {internal | external}] [metric` *`metric-value`*`][metric-type {external | internal}] [route-map` *`map-name`*`]` command.

Parameters

process-id	Enter a number that corresponds to the OSPF process ID to be redistributed. The range is from 1 to 65355.
metric *metric-value*	(OPTIONAL) The value used for the redistributed route. Use a metric value that is consistent with the destination protocol. The range is from 0 to 16777215. The default is **0**.

metric-type {external | internal}	(OPTIONAL) The external link type associated with the default route advertised into a routing domain. The two options are: • `external` • `internal`
level-1	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 1 routes.
level-1-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level-1-2 routes.
level-2	(OPTIONAL) Routes are independently redistributed into IS-IS as Level 2 routes. This setting is the default.
match {external | internal}	(OPTIONAL) The command used for OSPF to route and redistribute into other routing domains. The values are • `internal` • `external`
route-map *map-name*	`map-name` is an identifier for a configured route map. The route map should filter imported routes from the source routing protocol to the current routing protocol. If you do not specify a map-name, all routes are redistributed. If you specify a keyword, but fail to list route map tags, no routes are imported.

Defaults Refer to Parameters.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.5.1.0	Added support for IPv6 ISIS.
Version 6.3.1.0	Introduced.

Usage Information	How a metric value assigned to a redistributed route is advertised depends on how on the configuration of the `metric-style` command. If the `metric-style` command is set for Narrow mode and the metric value in the `redistribute ospf` command is set to a number higher than 63, the metric value advertised in LSPs is 63. If the `metric-style` command is set for wide mode, the metric value in the `redistribute ospf` command is advertised.

router isis

Allows you to enable the IS-IS routing protocol and to specify an IP IS-IS process.

S6000

Syntax

`router isis [tag]`

To disable IS-IS routing, use the `no router isis [tag]` command.

Parameters

tag	(OPTIONAL) This is a unique name for a routing process. A null tag is assumed if the `tag` option is not specified. The tag name must be unique for all IP router processes for a given router.

Defaults

Not configured.

Command Modes

ROUTER ISIS

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

Configure a network entity title (the `net` command) to specify the area address and the router system ID.

Enable routing on one or more interfaces to establish adjacencies and establish dynamic routing.

You can configure only one IS-IS routing process to perform Level 2 routing. A `level-1-2` designation performs Level 1 and Level 2 routing at the same time.

Related Commands

- ip router isis — configures IS-IS routing processes for IP on interfaces and attaches an area designator to the routing process.
- net — configures an IS-IS network entity title (NET) for a routing process.
- is-type — assigns a type for a given area.

set-overload-bit

To set the overload bit in its non-pseudonode LSPs, configure the router. This setting prevents other routers from using it as an intermediate hop in their shortest path first (SPF) calculations.

S6000

Syntax

`set-overload-bit`

To return to the default values, use the `no set-overload-bit` command.

Defaults

Not set.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.8.1.0	Added support for multi-topology ISIS.
Version 6.3.1.0	Introduced.

Usage Information

Set the overload bit when a router experiences problems, such as a memory shortage due to an incomplete link state database which can result in an incomplete or inaccurate routing table. If you set the overload bit in its LSPs, other routers ignore the unreliable router in their SPF calculations until the router has recovered.

show config

Display the changes you made to the IS-IS configuration. Default values are not shown.

S6000

Syntax

```
show config
```

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.

Example (Router-Isis)

The bold section identifies that Multi-Topology IS-IS is enabled in Transition mode.

```
FTOS(conf-router_isis)#show config
!
router isis
clns host ISIS 49.0000.0001.F100.E120.0013.00
log-adjacency-changes
net 49.0000.0001.F100.E120.0013.00
!
address-family ipv6 unicast
maximum-paths 16
multi-topology transition
set-overload-bit
spf-interval level-1 100 15 20
spf-interval level-2 120 20 25
exit-address-family
```

Example (Address-Family_IPv6)

The bold section identifies that Multi-Topology IS-IS is enabled in Transition mode.

```
FTOS(conf-router_isis-af_ipv6)#show conf
!
address-family ipv6 unicast
maximum-paths 16
multi-topology transition
set-overload-bit
spf-interval level-1 100 15 20
spf-interval level-2 120 20 25
exit-address-family
```

show isis database

Display the IS-IS link state database.

S6000

Syntax

```
show isis database [level-1 | level-2] [local] [detail |
summary] [lspid]
```

Parameters

level-1	(OPTIONAL) Displays the Level 1 IS-IS link-state database.
level-2	(OPTIONAL) Displays the Level 2 IS-IS link-state database.
local	(OPTIONAL) Displays local link-state database information.
detail	(OPTIONAL) Detailed link-state database information of each LSP displays when specified. If not specified, a summary displays.
summary	(OPTIONAL) Summary of link-state database information displays when specified.
lspid	(OPTIONAL) Display only the specified LSP.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.1	Introduced on the S4810.

Usage Information

The following describes the `show isis database` command shown in the following example.

Field	Description
IS-IS Level-1/ Level-2 Link State Database	Displays the IS-IS link state database for Level 1 or Level 2.
LSPID	Displays the LSP identifier.

Field	Description
	The first six octets are the System ID of the originating router. The first six octets are the System ID of the originating router. The next octet is the pseudonode ID. If this byte is not zero, the LSP describes system links. If this byte is zero (0), the LSP describes the state of the originating router. The designated router for a LAN creates and floods a pseudonode LSP and describes the attached systems. The last octet is the LSP number. An LSP is divided into multiple LSP fragments if there is more data than cannot fit in a single LSP. Each fragment has a unique LSP number. An * after the LSPID indicates that the system originates an LSP where this command was issued.
LSP Seq Num	This value is the sequence number for the LSP that allows other systems to determine if they have received the latest information from the source.
LSP Checksum	This is the checksum of the entire LSP packet.
LSP Holdtime	This value is the amount of time, in seconds, that the LSP remains valid. A zero holdtime indicates that this is a purged LSP and is being removed from the link state database. A value between brackets indicates the duration that the purged LSP stays in the database before being removed.
ATT	This value represents the Attach bit. This value indicates that the router is a Level 2 router and can reach other areas. Level 1-only routers and Level 1-2 routers that have lost connection to other Level 2 routers use the Attach bit to find the closest Level 2 router. They point a default route to the closest Level 2 router.
P	This value represents the P bit. This bit is always set to zero as Dell Networking does not support area partition repair.
OL	This value represents the overload bit, determining congestion. If the overload bit is set, other routers do not use this system as a transit router when calculating routes.

Example

The bold sections identify that MultiTopology IS-IS is enabled.

```
FTOS#show isis database

IS-IS Level-1 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
ISIS.00-00 * 0x00000006 0xCF43    580          0/0/0

IS-IS Level-2 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
```

```
ISIS.00-00 * 0x00000006 0xCF43    580          0/0/0
!
FTOS#show isis database detail ISIS.00-00

IS-IS Level-1 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
ISIS.00-00 * 0x0000002B 0x853B    1075         0/0/0
  Area Address: 49.0000.0001
  NLPID: 0xCC 0x8E
  IP Address: 10.1.1.1
  IPv6 Address: 1011::1
  Topology: IPv4 (0x00) IPv6 (0x8002)
  Metric: 10   IS OSPF.00
  Metric: 10   IS (MT-IPv6) OSPF.00
  Metric: 10   IP 15.1.1.0 255.255.255.0
  Metric: 10   IPv6 (MT-IPv6) 1511::/64
 Metric: 10   IPv6 (MT-IPv6) 2511::/64
 Metric: 10   IPv6 (MT-IPv6) 1011::/64
  Metric: 10   IPv6 1511::/64
  Metric: 10   IP 10.1.1.0 255.255.255.0
    Hostname: ISIS

IS-IS Level-2 Link State Database
LSPID    LSP Seq Num LSP Checksum LSP Holdtime ATT/P/OL
ISIS.00-00 * 0x0000002D 0xB2CD    1075         0/0/0
  Area Address: 49.0000.0001
  NLPID: 0xCC 0x8E
  IP Address: 10.1.1.1
  IPv6 Address: 1011::1
  Topology: IPv4 (0x00) IPv6 (0x8002)
  Metric: 10   IS OSPF.00
  Metric: 10   IS (MT-IPv6) OSPF.00
  Metric: 10   IP 10.1.1.0 255.255.255.0
  Metric: 10   IP 15.1.1.0 255.255.255.0
  Metric: 20   IP 10.3.3.0 255.255.255.0
  Metric: 10   IPv6 (MT-IPv6) 1011::/64
 Metric: 10   IPv6 (MT-IPv6) 1511::/64
 Metric: 10   IPv6 (MT-IPv6) 2511::/64
 Metric: 20   IPv6 (MT-IPv6) 1033::/64
  Metric: 10   IPv6 2511::/64
  Metric: 20   IPv6 1033::/64
  Hostname: ISIS
FTOS#
```

show isis graceful-restart detail

Display detailed IS-IS graceful restart related settings.

S6000

Syntax	`show isis graceful-restart detail`
Command Modes	• EXEC • EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.1.0	Introduced on the E-Series.

Example

```
FTOS#show isis graceful-restart detail
Configured Timer Value
======================
Graceful Restart    : Enabled
T3 Timer            : Manual
T3 Timeout Value    : 30
T2 Timeout Value    : 30 (level-1), 30 (level-2)
T1 Timeout Value    : 5, retry count: 1
Adjacency wait time : 30

Operational Timer Value
======================
Current Mode/State     : Normal/RUNNING
T3 Time left           : 0
T2 Time left           : 0 (level-1), 0 (level-2)
Restart ACK rcv count  : 0 (level-1), 0 (level-2)
Restart Req rcv count  : 0 (level-1), 0 (level-2)
Suppress Adj rcv count : 0 (level-1), 0 (level-2)
Restart CSNP rcv count : 0 (level-1), 0 (level-2)
Database Sync count    : 0 (level-1), 0 (level-2)
FTOS#
```

show isis hostname

Display IS-IS host names configured or learned on the E-Series.

S6000

Syntax `show isis hostname`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Example

```
FTOS#show isis hostname
System Id       Dynamic Name Static Name
*F100.E120.0013 Force10      ISIS
FTOS#
```

show isis interface

Display detailed IS-IS interface status and configuration information.

S6000

Syntax `show isis interface [interface]`

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Example

```
FTOSF>show isis int
GigabitEthernet 0/7 is up, line protocol is up
  MTU 1497, Encapsulation SAP
  Routing Protocol: IS-IS
    Circuit Type: Level-1-2
    Interface Index 37847070, Local circuit ID 1
    Level-1 Metric: 10, Priority: 64, Circuit ID: systest-3.01
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
    Number of active level-1 adjacencies: 1
    Level-2 Metric: 10, Priority: 64, Circuit ID: systest-3.01
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
    Number of active level-2 adjacencies: 1
    Next IS-IS LAN Level-1 Hello in 2 seconds
    Next IS-IS LAN Level-2 Hello in 1 seconds
    LSP Interval: 33
GigabitEthernet 0/8 is up, line protocol is up
  MTU 1497, Encapsulation SAP
  Routing Protocol: IS-IS
    Circuit Type: Level-1-2
    Interface Index 38371358, Local circuit ID 2
    Level-1 Metric: 10, Priority: 64, Circuit ID: systest-3.02
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
    Number of active level-1 adjacencies: 1
    Level-2 Metric: 10, Priority: 64, Circuit ID: systest-3.02
     Hello Interval: 10, Hello Multiplier: 3, CSNP Interval: 10
--More--
```

show isis neighbors

Display information about neighboring (adjacent) routers.

S6000

Syntax `show isis neighbors [level-1 | level-2] [detail] [interface]`

Parameters

level-1	(OPTIONAL) Displays information about Level 1 IS-IS neighbors.
level-2	(OPTIONAL) Displays information about Level 2 IS-IS neighbors.
detail	(OPTIONAL) Displays detailed information about neighbors.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information:

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.

Usage Information

Use this command to confirm that the neighbor adjacencies are operating correctly. If you suspect that they are not, you can verify the specified area addresses of the routers by using the `show isis neighbors` command.

The following describes the `show isis neighbors` command shown in the following example.

Field	Description
System Id	The value that identifies a system in an area.
Interface	The interface, slot, and port in which the router was discovered.
State	The value providing status about the adjacency state. The range is Up and Init.
Type	This value displays the adjacency type (Layer 2, Layer 2 or both).
Priority	IS-IS priority the neighbor advertises. The neighbor with highest priority becomes the designated router for the interface.
Uptime	Displays the interfaces uptime.

Field	Description
Circuit Id	The neighbor's interpretation of the designated router for the interface.

Example

The bold sections below identify that Multi-Topology IS-IS is enabled.

```
FTOS#show isis neighbors
System Id Interface State Type Priority Uptime Circuit Id
TEST Gi 7/1 Up L1L2(M) 127 09:28:01 TEST.02
!
FTOS#show isis neighbors detail
System Id Interface State Type Priority Uptime Circuit Id
TEST Gi 7/1 Up L1L2(M) 127 09:28:04 TEST.02 Area Address(es):
49.0000.0001
  IP Address(es): 25.1.1.3*
  MAC Address: 0000.0000.0000
  Hold Time: 28
  Link Local Address: fe80::201:e8ff:fe00:492c
  Topology: IPv4 IPv6 , Common (IPv4 IPv6 )
 Adjacency being used for MTs: IPv4 IPv6
FTOS#
```

show isis protocol

Display IS-IS routing information.

S6000

Syntax

`show isis protocol`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Example

The bold section identifies that Multi-Topology IS-IS is enabled.

```
FTOS#show isis protocol
IS-IS Router: <Null Tag>
```

```
  System Id: F100.E120.0013 IS-Type: level-1-2
  Manual area address(es):
   49.0000.0001
  Routing for area address(es):
   49.0000.0001
  Interfaces supported by IS-IS:
  GigabitEthernet 1/0 - IP - IPv6
  GigabitEthernet 1/1 - IP - IPv6
  GigabitEthernet 1/10 - IP - IPv6
  Loopback 0 - IP - IPv6
Redistributing:
Distance: 115
Generate narrow metrics: level-1-2
Accept narrow metrics:   level-1-2
Generate wide metrics:   none
Accept wide metrics:     none
Multi Topology Routing is enabled in transition mode.
FTOS#
```

show isis traffic

This command allows you to display IS-IS traffic interface information.

S6000

Syntax

`show isis traffic [`*`interface`*`]`

Parameters

interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Introduced on the Z9000.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

The following describes the `show isis traffic` command shown in the following example.

Item	Description
Level-1/Level-2 Hellos (sent/rcvd)	Displays the number of Hello packets sent and received.
PTP Hellos (sent/ rcvd)	Displays the number of point-to-point Hellos sent and received.
Level-1/Level-2 LSPs sourced (new/refresh)	Displays the number of new and refreshed LSPs.
Level-1/Level-2 LSPs flooded (sent/rcvd)	Displays the number of flooded LSPs sent and received.
Level-1/Level-2 LSPs CSNPs (sent/ rcvd)	Displays the number of CSNP LSPs sent and received.
Level-1/Level-2 LSPs PSNPs (sent/ rcvd)	Displays the number of PSNP LPSs sent and received.
Level-1/Level-2 DR Elections	Displays the number of times designated router elections ran.
Level-1/Level-2 SPF Calculations	Displays the number of shortest path first calculations.
LSP checksum errors received	Displays the number of checksum errors LSPs received.
LSP authentication failures	Displays the number of LSP authentication failures.

Example

```
FTOS#sho is traffic
  IS-IS: Level-1 Hellos (sent/rcvd) : 0/721
  IS-IS: Level-2 Hellos (sent/rcvd) : 900/943
  IS-IS: PTP Hellos (sent/rcvd) : 0/0
  IS-IS: Level-1 LSPs sourced (new/refresh) : 0/0
  IS-IS: Level-2 LSPs sourced (new/refresh) : 1/3
  IS-IS: Level-1 LSPs flooded (sent/rcvd) : 0/0
  IS-IS: Level-2 LSPs flooded (sent/rcvd) : 5934/5217
  IS-IS: Level-1 LSPs CSNPs (sent/rcvd) : 0/0
  IS-IS: Level-2 LSPs CSNPs (sent/rcvd) : 472/238
  IS-IS: Level-1 LSPs PSNPs (sent/rcvd) : 0/0
  IS-IS: Level-2 LSPs PSNPs (sent/rcvd) : 10/337
  IS-IS: Level-1 DR Elections : 4
  IS-IS: Level-2 DR Elections : 4
  IS-IS: Level-1 SPF Calculations : 0
  IS-IS: Level-2 SPF Calculations : 389
  IS-IS: LSP checksum errors received : 0
  IS-IS: LSP authentication failures : 0
FTOS#
```

spf-interval

Specify the minimum interval between shortest path first (SPF) calculations.

S6000

Syntax

`spf-interval [level-l | level-2]` *`interval seconds`* `[`*`initial_wait_interval seconds`* `[`*`second_wait_interval seconds`*`]]`

To restore default values, use the `no spf-interval [level-l | level-2]` *`interval seconds`* `[`*`initial_wait_interval seconds`* `[`*`second_wait_interval seconds`*`]]` command.

Parameters

level-l	(OPTIONAL) Enter the keyword `level-1` to apply the configuration to Level-1 SPF calculations.
level-2	(OPTIONAL) Enter the keyword `level-2` to apply the configuration to Level-2 SPF calculations.
interval seconds	Enter the maximum number of seconds between SPF calculations. The range is from 0 to 120 seconds. The default is **10 seconds**.
initial_wait_interval seconds	(OPTIONAL) Enter the initial wait time, in seconds, before running the first SPF calculations. The range is from 0 to 120 seconds. The default is **5 seconds**.
second_wait_interval seconds	(OPTIONAL) Enter the wait interval, in seconds, between the first and second SPF calculations. The range is from 0 to 120 seconds. The default is **5 seconds**.

Defaults

Refer to *Parameters*.

Command Modes

- ROUTER ISIS (*for IPv4*)
- CONFIGURATION-ROUTER-ISIS-ADDRESS-FAMILY-IPV6 (*for IPv6*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.8.1.0	Added support for multi-topology ISIS.
Version 7.5.1.0	Added support for SPF Throttling Enhancement.

Usage Information

This command `spf-interval` in CONFIG-ROUTER-ISIS-AF-IPV6 mode is used for IPv6 Multi-Topology route computation only. If using Single Topology mode, use the `spf-interval` command in CONFIG-ROUTER-ISIS mode for both IPv4 and IPv6 route computations.

SPF throttling slows down the frequency at which route calculations are performed during network instability. Even though throttling route calculations slows down network convergence, not throttling can result in a network not functioning as expected. If network topology is unstable, throttling slows down the scheduling of route calculations until the topology regains its stability.

The first route calculation is controlled by the initial wait interval and the second calculation is controlled by the second wait interval. Each subsequent wait interval is twice as long as the previous one until the wait interval reaches the maximum wait time specified (`interval seconds`). After the network calms down and there are no triggers for two times the maximum interval, fast behavior is restored (the initial wait time).

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Link Aggregation Control Protocol (LACP)

This chapter contains commands for Dell Networks's implementation of the link aggregation control protocol (LACP) for creating dynamic link aggregation groups (LAGs) — known as "port-channels" in the Dell Networking operating software. The LACP commands in this chapter are supported by Dell Networking OS on the S6000 platform.

NOTE: For static LAG commands, refer to Port Channel Commands in the Interfaces chapter), based on the standards specified in the IEEE 802.3 Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

clear lacp counters

Clear port channel counters.

S6000

Syntax

```
clear lacp port-channel-number counters
```

Parameters

port-channel-number	Enter a port-channel number. The range is from 1 to 128.

Defaults

Without a Port Channel specified, the command clears all Port Channel counters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Version 6.2.1.1	Introduced on the E-Series.

Related Commands

show lacp — displays the LACP configuration.

debug lacp

Debug LACP (configuration, events, and so on).

S6000

Syntax

```
debug lacp [config | events | pdu [interface-type [in | out]]]
```

To disable LACP debugging, use the `no [config | events | pdu [interface-type [in | out]]]` command.

Parameters

config	(OPTIONAL) Enter the keyword `config` to debug the LACP configuration.
events	(OPTIONAL) Enter the keyword `events` to debug the LACP event information.
pdu	(OPTIONAL) Enter the keyword `pdu` to debug the LACP Protocol Data Unit information.
interface-type in | out	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. Optionally, enter an `in` or `out` parameter: • Receive enter `in` • Transmit enter `out`

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

lacp long-timeout

Configure a long timeout period (30 seconds) for an LACP session.

S6000

Syntax

`lacp long-timeout`

To reset the timeout period to a short timeout (1 second), use the `no lacp long-timeout` command.

Defaults

1 second

Command Modes

INTERFACE (conf-if-po-number)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

This command applies to dynamic port-channel interfaces only. When applied on a static port-channel, this command has no effect.

Related Commands	show lacp — displays the LACP configuration.

lacp port-priority

To influence which ports will be put in Standby mode when there is a hardware limitation that prevents all compatible ports from aggregating, configure the port priority.

S6000

Syntax

`lacp port-priority priority-value`

To return to the default setting, use the `no lacp port-priority priority-value` command.

Parameters

priority-value	Enter the port-priority value. The higher the value number, the lower the priority. The range is from 1 to 65535. The default is **32768**.

Defaults	**32768**
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

lacp system-priority

Configure the LACP system priority.

S6000

Syntax `lacp system-priority` *`priority-value`*

Parameters

priority-value	Enter the port-priority value. The higher the value number, the lower the priority. The range is from 1 to 65535. The default is **32768**.

Defaults **32768**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

port-channel-protocol lacp

Enable LACP on any LAN port.

S6000

Syntax `port-channel-protocol lacp`

To disable LACP on a LAN port, use the `no port-channel-protocol lacp` command.

Command Modes INTERFACE

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.2.1.1	Introduced on the E-Series.

Related Commands	show lacp — displays the LACP information. show interfaces port-channel — displays information on configured Port Channel groups.

show lacp

Display the LACP matrix.

S6000

Syntax	`show lacp port-channel-number [sys-id	counters]`
Parameters	

port-channel-number	Enter a port-channel number. The range is from 1 to 128.
sys-id	(OPTIONAL) Enter the keywords `sys-id` and the value that identifies a system.
counters	(OPTIONAL) Enter the keyword `counters` to display the LACP counters.

Defaults	Without a Port Channel specified, the command clears all Port Channel counters.
Command Modes	• EXEC • EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Example (Port-Channel-Number)

```
Dell#show lacp 1
Port-channel 1 admin up, oper up, mode lacp
Actor   System ID:Priority 32768, Address 0001.e800.a12b
Partner System ID:Priority 32768, Address 0001.e801.45a5
                  Actor Admin Key 1, Oper Key 1, Partner Oper
Key 1
                  LACP LAG 1 is an aggregatable link

A-Active LACP, B-Passive LACP, C-Short Timeout, D-Long Timeout
E-Aggregatable Link, F-Individual Link, G-IN_SYNC, H-
OUT_OF_SYNC
I-Collection enabled, J-Collection disabled, K-Distribution
enabled L-Distribution disabled,
M-Partner Defaulted, N-Partner Non-defaulted, O-Receiver is in
expired state,
P-Receiver is not in expired state

Port Gi 10/6 is enabled, LACP is enabled and mode is lacp
  Actor   Admin: State ACEHJLMP Key 1    Priority 128
           Oper: State ACEGIKNP Key 1    Priority 128
  Partner Admin: State BDFHJLMP Key 0    Priority 0
           Oper: State BCEGIKNP Key 1    Priority 128
Dell#
```

Example (Sys-id)

```
Dell#show lacp 1 sys-id
Actor    System ID: Priority 32768, Address 0001.e800.a12b
Partner  System ID: Priority 32768, Address 0001.e801.45a5

Dell#
```

Example (Counter)

```
Dell#show lacp 1 counters
----------------------------------------------------
           LACP PDU      Marker PDU    Unknown   Illegal
Port     Xmit Recv    Xmit Recv        Pkts Rx   Pkts Rx
-----------------------------------------------------
Gi 10/6  200  200       0    0         0          0
Dell#
```

Related Commands

clear lacp counters — clears the LACP counters.

show interfaces port-channel — displays information on configured Port Channel groups.

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Layer 2

This chapter describes commands to configure Layer 2 features.

This chapter contains the following sections:

- MAC Addressing Commands
- Virtual LAN (VLAN) Commands
-

The VLAN commands are supported on all the S6000 platform.

MAC Addressing Commands

The following commands are related to configuring, managing, and viewing MAC addresses.

mac-address-table aging-time

Specify an aging time for MAC addresses to remove from the MAC address table.

S6000

Syntax

`mac-address-table aging-time seconds`

Parameters

seconds	Enter either zero (0) or a number as the number of seconds before MAC addresses are relearned. To disable aging of the MAC address table, enter `0`. The range is from 10 to 1000000. The default is **1800 seconds**.

Defaults

1800 seconds

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	On the E-Series, available in INTERFACE VLAN context, reduced the minimum aging time in the INTERFACE VLAN context from 10 seconds to 1 second.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

mac learning-limit — sets the MAC address learning limits for a selected interface.

show mac-address-table aging-time — displays the MAC aging time.

mac-address-table static

Associate specific MAC or hardware addresses to an interface and VLANs.

S6000

Syntax

`mac-address-table static` *`mac-address`* `{multicast vlan` *`vlan-id`* `output—range` *`interface`*`}{`*`output interface`* `vlan` *`vlan-id`*`}`

To remove a MAC address, use the `no mac-address-table static` *`mac-address`* `output` *`interface`* `vlan` *`vlan-id`* command.

Parameters

mac-address	Enter the 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format.
multicast	Enter a vlan port to where L2 multicast MAC traffic is forwarded. NOTE: Use this option if you want multicast functionality in an L2 VLAN without IGMP protocols.
`output` *interface*	For a unicast MAC address, enter the keyword `output` then one of the following interfaces for which traffic is forwarded: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
`output-range` *interface*	For a multicast MAC address, enter the keyword `output-range` then one of the following interfaces to indicate a range of ports for which traffic is forwarded: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.

- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

vlan *vlan-id*	Enter the keyword `vlan` then a VLAN ID number from 1 to 4094.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.1(0.0)	Added support for output range parameter for S4810 and Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example (Unicast)

```
mac-address-table static 00:01:00:00:00:01 {output Te 0/2 vlan
2}
```

Example (Multicast)

```
mac-address-table static 01:00:5E:01:00:01 {multicast vlan
2 output—range Te 0/2,Te 0/3}
```

Related Commands

show mac-address-table — displays the MAC address table.

mac-address-table station-move refresh-arp

Ensure that address resolution protocol (ARP) refreshes the egress interface when a station move occurs due to a topology change.

S6000

Syntax	`[no] mac-address-table station-move refresh-arp`
Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information	For details about using this command, refer to the "NIC Teaming" section of the Layer 2 chapter in the *Dell Networking OS Configuration Guide*.

mac learning-limit

Limit the maximum number of MAC addresses (static + dynamic) learned on a selected interface.

S6000

Syntax

```
mac learning-limit address_limit [vlan vlan-id] [station-move-
violation [dynamic]] [dynamic [no-station-move| station-move]]
```

Parameters

address_limit	Enter the maximum number of MAC addresses that can be learned on the interface. The range is from 1 to 1000000.
vlan *vlan-id*	Enter the keyword then the VLAN ID. The range is from 1 to 4094.
dynamic	(OPTIONAL) Enter the keyword `dynamic` to allow aging of MACs even though a learning limit is configured.

station-move-violation	(OPTIONAL) Enter the keywords `station-move` to allow a station move on learned MAC addresses.

Defaults

- On S-Series, the default behavior is dynamic.

NOTE: "Static" means manually entered addresses, which do not age.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Deprecated the `no-station-move` command (replaced by the `mac-learning-limit mac-address-sticky` command).
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added the `vlan` option on the E-Series.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series. Added the `station-move` option.
Version 6.5.1.0	Added support for MAC Learning-Limit on the LAG.

Usage Information

This command and its options are supported on physical interfaces, static LAGs, LACP LAGs, and VLANs.

If you do not specify the `vlan` option, the MAC address counters are not VLAN-based. That is, the sum of the addresses learned on all VLANs (not having any learning limit configuration) is counted against the MAC learning limit.

MAC Learning Limit violation logs and actions are not available on a per-VLAN basis.

With the keyword `no-station-move` option, MAC addresses learned through this feature on the selected interface persist on a per-VLAN basis, even if received on another interface. Enabling or disabling this option has no effect on already learned MAC addresses.

After the MAC address learning limit is reached, the MAC addresses do not age out unless you add the `dynamic` option. To clear statistics on MAC address learning, use the `clear counters` command with the learning-limit parameter.

NOTE: If you configure this command on an interface in a routed VLAN, and after the MAC addresses learned reaches the limit set in the `mac learning-limit` command, IP protocols are affected. For example, VRRP sets multiple VRRP Masters and OSPF may not come up.

When a channel member is added to a port-channel and there is not enough ACL CAM space, the MAC limit functionality on that port-channel is undefined. When this occurs, un-configure the existing configuration first and then reapply the limit with a lower value.

Related Commands

mac learning-limit mac-address-sticky — Replaces deprecated `no-station-move` parameter.

show mac learning-limit — displays MAC learning-limit configuration.

mac learning-limit learn-limit-violation

Configure an action for a MAC address learning-limit violation.

S6000

Syntax

```
mac learning-limit learn-limit-violation {log | shutdown}
```

To return to the default, use the `no mac learning-limit learn-limit-violation {log | shutdown}` command.

Parameters

log	Enter the keyword `log` to generate a syslog message on a learning-limit violation.
shutdown	Enter the keyword `shutdown` to shut down the port on a learning-limit violation.

Defaults

none

Command Modes

INTERFACE (conf-if-interface-slot/port)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.8.1.0	Introduced on the C-Series.
Version 7.5.1.0	Introduced on the E-Series.

Usage Information

This command is supported on physical interfaces, static LAGs, and LACP LAGs.

Related Commands

show mac learning-limit — displays details of the mac learning-limit.

mac learning-limit mac-address-sticky

Maintain the dynamically learned mac addresses as sticky MAC addresses on the selected port.

S6000

Syntax

`mac learning-limit mac-address-sticky`

To convert the sticky MAC addresses to dynamic MAC addresses, use the `no mac learning-limit` command.

Parameters

mac-address-sticky	Configures the dynamic MAC addresses as sticky on an interface.

Defaults

none

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

If you configure `mac-learn-limit` and the sticky MAC feature is enabled, dynamically learned MAC addresses are converted to sticky for that port. Any new MAC address that is learned also becomes sticky for that port.

Related Commands

show mac learning-limit — displays the details of the mac learning-limit.

mac learning-limit station-move-violation

Specify the actions for a station move violation.

S6000

Syntax	`mac learning-limit station-move-violation {log | shutdown-both | shutdown-offending | shutdown-original}` To disable a configuration, use the `no mac learning-limit station-move-violation` command, then the configured keyword.

Parameters

log	Enter the keyword `log` to generate a syslog message on a station move violation.
shutdown-both	Enter the keyword `shutdown` to shut down both the original and offending interface and generate a syslog message.
shutdown-offending	Enter the keywords `shutdown-offending` to shut down the offending interface and generate a syslog message.
shutdown-original	Enter the keywords `shutdown-original` to shut down the original interface and generate a syslog message.

Defaults	none
Command Modes	INTERFACE (conf-if-interface-slot/port)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.8.1.0	Introduced on the C-Series.
Version 7.5.1.0	Introduced on the E-Series.

Usage Information	This command is supported on physical interfaces, static LAGs, and LACP LAGs.
Related Commands	show mac learning-limit — displays details of the mac learning-limit.

mac learning-limit reset

Reset the MAC address learning-limit error-disabled state.

S6000

Syntax `mac learning-limit reset`

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.5.1.0	Introduced on the E-Series.

show mac-address-table

Display the MAC address table.

S6000

Syntax

```
show mac-address-table [address mac-address | interface
interface | vlan vlan-id] [aging-time] [dynamic | static]
[count [vlan vlan-id] [interface interface-type [slot [/
port]]]]
```

Parameters

address *mac-address*	(OPTIONAL) Enter the keyword `address` then a MAC address in the nn:nn:nn:nn:nn:nn format to display information on that MAC address.
dynamic	(OPTIONAL) Enter the keyword `dynamic` to display only those MAC addresses the switch dynamically learns. Optionally, you can also add one of these combinations: `address/`*`mac-address`*, `interface/`*`interface`*, or `vlan` *`vlan-id`*.

static	(OPTIONAL) Enter the keyword `static` to display only those MAC addresses specifically configured on the switch. Optionally, you can also add one of these combinations: `address/`*`mac-address`*, `interface/`*`interface`*, or `vlan` *`vlan-id`*.
aging-time	Enter the keyword `aging-time` to display only aging-time information.
interface *interface*	(OPTIONAL) Enter the keyword `interface` then the interface type, slot and port information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
interface *interface-type*	(OPTIONAL) Instead of entering the keyword `interface` then the interface type, slot and port information, as above, you can enter the interface type, then just a slot number.
vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the VLAN ID to display the MAC address assigned to the VLAN. The range is 1 to 4094.
count	(OPTIONAL) Enter the keyword `count`, then optionally, by an interface or VLAN ID, to display total or interface-specific static addresses, dynamic addresses, and MAC addresses in use.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Updated the output.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show mac-address-table` command shown in the following example.

Column Heading	Description
VlanId	Displays the VLAN ID number.
Mac Address	Displays the MAC address in nn:nn:nn:nn:nn:nn format.
Type	Lists whether the MAC address was manually configured (Static), learned dynamically (Dynamic), or associated with a specific port (Sticky).
Interface	Displays the interface type and slot/port information. The following abbreviations describe the interface types: • gi — Gigabit Ethernet then a slot/port. • po — Port Channel then a number. The range is from 1 to 255 for TeraScale. • so —SONET then a slot/port. • te — 10 Gigabit Ethernet then a slot/port.
State	Lists if the MAC address is in use (Active) or not in use (Inactive).

Example

```
Dell(conf)#do show mac-address-table
Codes: *N - VLT Peer Synced MAC
VlanId    Mac
Address          Type         Interface       State
2     00:00:00:00:00:01      Dynamic (N)    Po
128         Active
2     00:00:00:00:00:02      Dynamic (N)    Po
10           Active
2     00:00:00:00:00:03      Dynamic            Po
100         Active
2     00:00:00:00:00:04      Dynamic            Po
10           Active
```

Usage Information

The following describes the `show mac-address-table` command shown in the following example.

Column Heading	Description
VlanId	Displays the VLAN ID number.
Mac Address	Displays the MAC address in nn:nn:nn:nn:nn:nn format.
Type	Lists whether the MAC address was manually configured (Static), learned (Dynamic), or associated with a specific port

Column Heading	Description
	(Sticky). An (N) indicates that the specified MAC address has been learnt by a neighbor and is synced to the node.
Interface	Displays the interface type and slot/port information. The following abbreviations describe the interface types: • gi — Gigabit Ethernet followed by a slot/port • po — Port Channel followed by a number. Range for Terascale is from 1 to 255. \ • so — Sonet followed by a slot/port. • te — 10–Gigabit Ethernet followed by a slot/port.
State	Lists if the MAC address is in use (Active) or not in use (Inactive).

The following describes the `show mac-address-table count` command shown in the following example.

Line Beginning With	Description
MAC Entries...	Displays the number of MAC entries learned per VLAN.
Dynamic Address...	Lists the number of dynamically learned MAC addresses.
Static Address...	Lists the number of user-defined MAC addresses.
Total MAC...	Lists the total number of MAC addresses the switch uses.

Example (Count)

```
Dell# show mac-address-table count
MAC Entries for all vlans :
Dynamic Address Count :               110
Static Address (User-defined) Count : 0
Sticky Address Count :                0
Total Synced Mac from Peer(N):        100
Total MAC Addresses in Use:           110
Dell#
```

Related Commands

show mac-address-table aging-time — displays MAC aging time.

show mac-address-table aging-time

Display the aging times assigned to the MAC addresses on the switch.

S6000

Syntax

`show mac-address-table aging-time [vlan vlan-id]`

Parameters

vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the VLAN ID to display the MAC address assigned to the VLAN. The range is from 1 to 4094.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added the `vlan` option on the E-Series.
Version 7.7.1.0	Introduced on the C-Series and S-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell#show mac-address-table aging-time
  Mac-address-table aging time : 1800

Dell#
```

Related Commands

show mac-address-table — displays the current MAC address configuration.

show mac learning-limit

Display MAC address learning limits set for various interfaces.

S6000

Syntax

`show mac learning-limit [violate-action] [detail] [interface *interface*]`

Parameters

violate-action	(OPTIONALY) Enter the keywords `violate-action` to display the MAC learning limit violation status.
detail	(OPTIONAL) Enter the keyword `detail` to display the MAC learning limit in detail.
interface *interface*	(OPTIONAL) Enter the keyword `interface` with the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.

Command Modes	- EXEC - EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added the `vlan` option on the E-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.5.1.0	Added support for the `violate-action` and `detail` options.
Version 6.5.1.0	Added support for Port Channel.

Example

```
Dell#show mac learning-limit
Interface  Learning  Dynamic    Static     Unknown SA
Slot/port  Limit     MAC count  MAC count  Drops
Gi 1/0     10        0          0          0
Gi 1/1     5         0          0          0
Dell#show mac learning-limit interface gig 1/0
Interface  Learning  Dynamic    Static     Unknown SA
Slot/port  Limit     MAC count  MAC count  Drops
Gi 1/0     10        0          0          0
```

Virtual LAN (VLAN) Commands

The following commands configure and monitor virtual LANs (VLANs). VLANs are a virtual interface and use many of the same commands as physical interfaces.

You can configure an IP address and Layer 3 protocols on a VLAN called Inter-VLAN routing. FTP, TFTP, ACLs and SNMP are not supported on a VLAN.

Occasionally, while sending broadcast traffic over multiple Layer 3 VLANs, the VRRP state of a VLAN interface may continually switch between Master and Backup.

NOTE: For more information, refer to VLAN Stacking and VLAN-related commands, such as portmode hybrid in the Interfaces chapter.

default vlan-id

Specify a VLAN as the Default VLAN.

S6000

Syntax

`default vlan-id vlan-id`

To remove the default VLAN status from a VLAN and VLAN 1 does not exist, use the `no default vlan-id vlan-id` syntax.

Parameters

vlan-id	Enter the VLAN ID number of the VLAN to become the new Default VLAN. The range is from 1 to 4094. The default is **1**.

Defaults

The Default VLAN is VLAN **1**.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

To return VLAN 1 as the Default VLAN, use this command syntax (`default-vlan-id 1`).

The Default VLAN contains only untagged interfaces.

Related Commands

interface vlan — configures a VLAN.

description

Add a description about the selected VLAN.

S6000

Syntax	`description description`
Parameters	**description** — Enter a text string description to identify the VLAN (80 characters maximum).
Defaults	none
Command Modes	INTERFACE VLAN
Command History	Version 9.0.2.0 — Introduced on the S6000. Version 8.3.19.0 — Introduced on the S4820T. Version 8.3.11.1 — Introduced on the Z9000. Version 8.3.7.0 — Introduced on the S4810. Version 7.6.1.0 — Introduced on the C-Series and S-Series. Version 6.3.1.1 — Introduced on the E-Series.
Related Commands	show vlan – displays the VLAN configuration.

default-vlan disable

Disable the default VLAN so that all switchports are placed in the Null VLAN until they are explicitly configured as a member of another VLAN.

S6000

Defaults	Enabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command. Version 9.0.2.0 — Introduced on the S6000. Version 8.3.19.0 — Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced

Usage Information

The `no default vlan disable` command is not listed in the running-configuration, but when the default VLAN is disabled, `default-vlan disable` is listed in the running-configuration.

name

Assign a name to the VLAN.

S6000

Syntax

`name` *`vlan-name`*

To remove the name from the VLAN, use the `no name` command.

Parameters

vlan-name	Enter up to 32 characters as the name of the VLAN.

Defaults

Not configured.

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

To display information about a named VLAN, enter the `show vlan` command with the name parameter or the show interfaces description command.

Related Commands

interface vlan — configures a VLAN.

show vlan — displays the current VLAN configurations on the switch.

show config

Display the current configuration of the selected VLAN.

S6000

Syntax	`show config`
Command Modes	INTERFACE VLAN
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell(conf-if-vl-100)#show config
!
interface Vlan 100
  no ip address
  no shutdown
Dell(conf-if-vl-100)#
```

show vlan

Display the current VLAN configurations on the switch.

S6000

Syntax `show vlan [brief | id` *`vlan-id`* `| name` *`vlan-name`*`]`

Parameters

brief (OPTIONAL) Enter the keyword `brief` to display the following information:

- VLAN ID
- VLAN name (left blank if none is configured)
- Spanning Tree Group ID
- MAC address aging time

- IP address

id *vlan-id*	(OPTIONAL) Enter the keyword `id` then a number from 1 to 4094. Only information on the VLAN specified is displayed.
name *vlan-name*	(OPTIONAL) Enter the keyword `name` then the name configured for the VLAN. Only information on the VLAN named is displayed.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.1. (0.0)	Updated to support OpenFlow.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Augmented to display PVLAN data for the C-Series and S-Series and revised the output to include the Description field to display a user-entered VLAN description.
Version 7.6.1.0	Introduced on the S-Series and revised the output to display Native VLAN.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show vlan` command shown in the following example.

Column Heading	Description
(Column 1 — no heading)	asterisk symbol (*) = Default VLAN G = GVRP VLAN P = primary VLAN C = community VLAN I = isolated VLAN O = OpenFlow

Column Heading	Description
NUM	Displays existing VLAN IDs.
Status	Displays the word *Inactive* for inactive VLANs and the word *Active* for active VLANs.
Q	• Displays G for GVRP tagged • M for member of a VLAN-Stack VLAN • T for tagged interface • U for untagged interface • x (not capitalized x) for Dot1x untagged • X (capitalized X) for Dot1x tagged • o (not capitalized o) for OpenFlow untagged • O (capitalized O) for OpenFlow tagged • H for VSN tagged • i (not capitalized i) for Internal untagged • I (capitalized I) for Internal tagged • v (not capitalized v) for VLT untagged • V (capitalized V) for VLT tagged
Ports	Displays the type, slot, and port information. • Po = port channel • Gi = gigabit Ethernet • Te = ten-gigabit Ethernet

Example

```
Dell#show vlan

Codes: * - Default VLAN, G - GVRP VLANs, P - Primary, C -
Community, I - Isolated
Q: U - Untagged, T - Tagged, O - Openflow
   x - Dot1x untagged, X - Dot1x tagged
   o - OpenFlow untagged, O - OpenFlow tagged
   G - GVRP tagged, M - Vlan-stack
   i - Internal untagged, I - Internal tagged, v - VLT
untagged, V - VLT tagged
    NUM  Status      Description   Q Ports
*   1    Inactive
    2    Active                    U Po1(Gi 13/0)
                                   T Po20(Gi 13/6), Gi 13/25
                                   T Gi 13/7
    3    Active T Po20(Gi 13/6)
                                   T Gi 13/7
                                   U Gi 13/1
    4    Active U Po2(Gi 13/2)
                                   T Po20(Gi 13/6)
                                   T Gi 13/7
    5    Active T Po20(Gi 13/6)
                                   T Gi 13/7
                                   U Gi 13/3
    6    Active U Po3(Gi 13/4)
                                   T Po20(Gi 13/6)
                                   T Gi 13/7
    7    Active T Po20(Gi 13/6)
                                  T Gi 13/7
                                  U Gi 13/5
P 100    Active T Po1(Gi 0/1)
                                  T Gi 0/2
C 101    Inactive T Gi 0/3
I 102    Inactive T Gi 0/4
Dell#
```

Example (VLAN ID)

```
Dell# show vlan id 40

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description Q Ports
     40   Active             M Gi 13/47

Dell#show vlan id 41

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description Q Ports
     41   Active             T Gi 13/47

Dell#show vlan id 42

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description Q Ports
     42   Active             U Gi 13/47
Dell#
```

Example (Brief)

```
Dell#show vlan br
VLAN  Name  STG  MAC Aging   IP Address
---- -----------------------------------
1           0    1800        unassigned
2           0    1800        2.2.2.2/24
3           0    1800        3.3.3.2/24
Dell#
```

Example (Name)

```
Dellconf)#interface vlan 222
Dell(conf-if-vl-222)#name test
Dell(conf-if-vl-222)#do show vlan name test

Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

     NUM  Status Description  Q Ports
     222  Inactive            U Gi 1/22
Dell(conf-if-vl-222)#
```

Example (OpenFlow instance)

```
    NUM    Status    Description                         Q Ports
*   1      Inactive
    3      Inactive
O   6      Inactive
O   8      Inactive
O   12     Inactive                                      O Te 0/10
```

Related Commands

vlan-stack compatible — enables the Stackable VLAN feature on the selected VLAN.

interface vlan — configures a VLAN.

tagged

Add a Layer 2 interface to a VLAN as a tagged interface.

S6000

Syntax

`tagged interface`

To remove a tagged interface from a VLAN, use the `no tagged interface` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

All interfaces in Layer 2 mode are untagged.

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.

Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

When you use the `no tagged` command, the interface is automatically placed in the Default VLAN as an untagged interface unless the interface is a member of another VLAN. If the interface belongs to several VLANs, remove it from all VLANs to change it to an untagged interface.

Tagged interfaces can belong to multiple VLANs, while untagged interfaces can only belong to one VLAN at a time.

Related Commands

interface vlan — configures a VLAN.

untagged — specifies which interfaces in a VLAN are untagged.

track ip

Track the Layer 3 operational state of a Layer 3 VLAN, using a subset of the VLAN member interfaces.

S6000

Syntax

`track ip interface`

To remove the tracking feature from the VLAN, use the `no track ip interface` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

Not configured.

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

When this command is configured, the VLAN is operationally UP if any of the interfaces specified in the `track ip` command are operationally UP, and the VLAN is operationally DOWN if none of the tracking interfaces are operationally UP.

If the `track ip` command is not configured, the VLAN's Layer 3 operational state depends on all the members of the VLAN.

The Layer 2 state of the VLAN, and hence the Layer 2 traffic, is not affected by the `track ip` command configuration.

Related Commands

interface vlan — configures a VLAN.

tagged — specifies which interfaces in a VLAN are tagged.

untagged

Add a Layer 2 interface to a VLAN as an untagged interface.

S6000

Syntax

`untagged interface`

To remove an untagged interface from a VLAN, use the `no untagged interface` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults

All interfaces in Layer 2 mode are untagged.

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Untagged interfaces can only belong to one VLAN.

In the Default VLAN, you cannot use the `no untagged interface` command. To remove an untagged interface from all VLANs, including the Default VLAN, enter INTERFACE mode and use the `no switchport` command.

Related Commands

interface vlan — configures a VLAN.

tagged — specifies which interfaces in a VLAN are tagged.

Far-End Failure Detection (FEFD)

The Dell Networking operating software supports far-end failure detection (FEFD) on the Ethernet interfaces of the S6000platform.

The FEFD feature detects and reports far-end link failures.

- FEFD is not supported on the Management interface.
- During an RPM failover, FEFD is operationally disabled for approximately 8 to 10 seconds.
- By default, FEFD is disabled.

debug fefd

Enable debugging of FEFD.

S6000

Syntax	`debug fefd {events	packets} [interface]` To disable debugging of FEFD, use the `no debug fefd {events	packets} [interface]` command.

Parameters

events	Enter the keyword `events` to enable debugging of FEFD state changes.
packets	Enter the keyword `packets` to enable debugging of FEFD to view information on packets sent and received.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/ port information.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enables far-end failure detection on an interface.
- fefd reset — enables FEFD globally on the system.

fefd

Enable Far-End Failure Detection on an interface, set the FEFD interval, or select the FEFD mode.

S6000

Syntax	`fefd {disable|interval|mode {aggressive|normal}`

Parameters

disable	Enter the keyword **disable** to disable FEFD for the specified interface.
interval	Enter the keyword **interval**, followed by a value to specify the FEFD interval in seconds. Range is from 3 to 300. Default is 15.
mode	Enter the keyword **mode** followed by the mode type to specify the FEFD mode. • **normal**: Change the link state to "unknown" when a far-end failure is detected by the software on that interface. When the interface is placed in an "unknown" state, the software brings down the line protocol. • **aggressive**: Change the link state to "error-disabled" when a far-end failure is detected by the software on that interface. When an interface is placed in an "error-disabled" state, you must enter the `fefd reset` command to reset the interface state. Range is normal or aggressive. Default is normal.

Defaults

Disabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

When you enter `no fefd` for an interface and `fefd-global`, FEFD is enabled on the interface because the `no fefd` command is not retained in the configuration file. To keep the interface FEFD disabled when the global configuration changes, use the `fefd reset` command.

Related Commands	- fefd disable — disables far-end failure detection on an interface. - fefd reset — enables FEFD globally on the system. - fefd mode — changes FEFD mode on an interface.

fefd disable

Disable FEFD on an interface only. This command overrides the `fefd reset` command for the interface.

Syntax

```
fefd disable
```

To re-enable FEFD on an interface, use the `no fefd disable` command.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Usage Information

When you enter `no fefd` for an interface and fefd-global, FEFD is enabled on the interface because the `no fefd` command is not retained in the configuration file. To keep the interface FEFD disabled when the global configuration changes, use the `fefd reset` command.

Related Commands

- fefd reset — enables FEFD globally on the system.
- fefd mode — changes FEFD mode on an interface.

fefd interval

Set an interval between control packets.

Syntax

```
fefd interval seconds
```

To return to the default value, use the `no fefd interval` command.

Parameters	*seconds*	Enter a number as the time between FEFD control packets. The range is from 3 to 300 seconds. The default is **15 seconds**.

Defaults **15 seconds**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enables far-end failure detection.

fefd mode

Change the FEFD mode on an interface.

Syntax `fefd mode {normal | aggressive}]`

To return the FEFD mode to the default of normal, use the `no fefd mode` command.

Parameters	normal	(OPTIONAL) Enter the keyword `normal` to change the link state to “unknown” when a far-end failure the software detects on that interface. When the interface is placed in “unknown” state, the software brings down the line protocol.
	aggressive	(OPTIONAL) Enter the keyword `aggressive` to change the link state to “error-disabled” when a far-end failure the software detects on that interface. When an interface is placed in “error-disabled” state, enter the `fefd reset` command to reset the interface state.

Defaults normal

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enables far-end failure detection.

fefd reset

Reset all interfaces or a single interface that was in “error-disabled” mode.

S6000

Syntax `fefd reset [interface]`

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/ port information.

Defaults Not configured.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enables far-end failure detection.

fefd-global interval

Configure an interval between FEFD control packets.

Syntax

`fefd-global interval seconds`

To return to the default value, use the `no fefd-global interval` command.

Parameters

seconds	Enter a number as the time between FEFD control packets. The range is from 3 to 300 seconds. The default is **15 seconds**.

Defaults

15 seconds

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Legacy E-Series command.	

Related Commands

- fefd — enables far-end failure detection.
- fefd-global — enables FEFD globally on the system.

fefd-global

Enable FEFD globally on the system.

S6000

Syntax	`fefd-global [interval` *`seconds`*`][mode {normal	aggressive}]` To disable FEFD globally, use the `no fefd-global [mode {normal	aggressive}]` command.

Parameters

interval *seconds*	Enter the keyword `interval` followed by the number of seconds to wait between FEFD control packets. Range is from 3 to 300 seconds. Default is 15 seconds.
normal	(OPTIONAL) Enter the keywords `mode normal` to change the link state to "unknown" when a far-end failure the software detects on that interface. When the interface is placed in "unknown" state, the software brings down the line protocol. The default is **Normal mode**.
aggressive	(OPTIONAL) Enter the keywords `mode aggressive` to change the link state to "error-disabled" when a far-end failure the software detects on that interface. When an interface is placed in "error-disabled" state, t enter the `fefd reset` command to reset the interface state.

Defaults Disabled.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Usage Information

If you enter only the `fefd-global` syntax, the mode is normal and the default interval is 15 seconds.

If you disable FEFD globally (`no fefd-global`), the system does not remove the FEFD interface configuration.

Related Commands

- fefd — enables far-end failure detection.
- fefd-global interval — configures an interval between FEFD control packets.
- show fefd — shows the FEFD command output.

show fefd

View FEFD status globally or on a specific interface.

S6000

Syntax `show fefd [interface]`

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/ port information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Legacy E-Series command.	

Usage Information

The following describes the `show fefd` command shown in the following example.

Field	Description
Interface	Displays the interfaces type and number.
Mode	Displays the mode (aggressive or normal) or NA if the interface contains `fefd reset` in its configuration.
Interval	Displays the interval between FEFD packets.
State	Displays the state of the interface and can be one of the following: • bi-directional (interface is up, connected and hearing neighbor's echoes). • err-disabled (only found when FEFD mode is aggressive and when the interface has not hearing its neighbor's echoes for three times the message interval. To reset an interface in this state, use the `fefd reset` command.) • unknown (only found when FEFD mode is normal. • locally disabled (interface contains the `fefd reset` command in its configuration). • Admin Shutdown (interface is disabled with the `shutdown` command).

Example

```
Dell#sh fefd
FEFD is globally 'ON', interval is 10 seconds, mode is
'Aggressive'.

INTERFACE MODE       INTERVAL   STATE
                     (second)
Gi 5/0   Aggressive  10         Admin Shutdown
Gi 5/1   Aggressive  10         Admin Shutdown
Gi 5/2   Aggressive  10         Admin Shutdown
Gi 5/3   Aggressive  10         Admin Shutdown
Gi 5/4   Aggressive  10         Admin Shutdown
Gi 5/5   Aggressive  10         Admin Shutdown
Gi 5/6   Aggressive  10         Admin Shutdown
Gi 5/7   Aggressive  10         Admin Shutdown
Gi 5/8   Aggressive  10         Admin Shutdown
Gi 5/9   Aggressive  10         Admin Shutdown
Gi 5/10  NA          NA         Locally disabled
Gi 5/11  Aggressive  10         Err-disabled
Dell#
```

Related Commands

- fefd — enables far-end failure detection.
- fefd disable — disables FEFD on an interface only.
- fefd-global — enables FEFD globally on the system.
- fefd reset — resets all interfaces or a single interface that was in “error-disabled” mode.

29

Link Layer Discovery Protocol (LLDP)

The link layer discovery protocol (LLDP) advertises connectivity and management from the local station to the adjacent stations on an IEEE 802 LAN.

This chapter contains the following sections:

- LLPD Commands
- LLDP-MED Commands

LLDP facilitates multi-vendor interoperability by using standard management tools to discover and make available a physical topology for network management. The Dell Networking operating software implementation of LLDP is based on IEEE standard 801.1ab.

TheDell Networking OS supports the basic LLDP commands on S6000 platform.

The starting point for using LLDP is invoking LLDP with the `protocol lldp` command in either CONFIGURATION or INTERFACE mode.

The information LLDP distributes is stored by its recipients in a standard management information base (MIB). You can access the information by a network management system through a management protocol such as simple network management protocol (SNMP).

LLPD Commands

The following are LLDP commands.

advertise dot1-tlv

Advertise dot1 TLVs (Type, Length, Value).

S6000

Syntax

```
advertise dot1-tlv {port-protocol-vlan-id | port-vlan-id |
vlan-name}
```

To remove advertised dot1-tlv, use the `no advertise dot1-tlv {port-protocol-vlan-id | port-vlan-id | vlan-name}` command.

Parameters

port-protocol-vlan-id	Enter the keywords `port-protocol-vlan-id` to advertise the port protocol VLAN identification TLV.
port-vlan-id	Enter the keywords `port-vlan-id` to advertise the port VLAN identification TLV.

vlan-name	Enter the keywords `vlan-name` to advertise the vlan-name TLV. This keyword is only supported on the C-Series and S-Series.

Defaults Disabled.

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series. Added the `vlan-name` option.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands

protocol lldp (Configuration) — enables LLDP globally.

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise dot3-tlv

Advertise dot3 TLVs (Type, Length, Value).

S6000

Syntax `advertise dot3-tlv {max-frame-size}`

To remove advertised dot3-tlv, use the `no advertise dot3-tlv {max-frame-size}` command.

Parameters

max-frame-size	Enter the keywords `max-frame-size` to advertise the dot3 maximum frame size.

Defaults none

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

clear lldp counters

Clear LLDP transmitting and receiving counters for all physical interfaces or a specific physical interface.

S6000

Syntax

```
clear lldp counters interface
```

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/ port information. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults none

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

clear lldp neighbors

Clear LLDP neighbor information for all interfaces or a specific interface.

S6000

Syntax

```
clear lldp neighbors {interface}
```

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/ port information. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults none

Command Modes EXEC Privilege

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.

Version 7.4.1.0	Introduced on the E-Series.

debug lldp interface

To display timer events, neighbor additions or deletions, and other information about incoming and outgoing packets, enable LLDP debugging.

S6000

Syntax

```
debug lldp interface {interface | all}{events | packet {brief |
detail} {tx | rx | both}}
```

To disable debugging, use the `no debug lldp interface {interface | all}{events} {packet {brief | detail} {tx | rx | both}}` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/ port information. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. NOTE: The `FastEthernet` option is not supported on the S-Series.
all	(OPTIONAL) Enter the keyword `all` to display information on all interfaces.
events	(OPTIONAL) Enter the keyword `events` to display major events such as timer events.
packet	(OPTIONAL) Enter the keyword `packet` to display information regarding packets coming in or going out.
brief	(OPTIONAL) Enter the keyword `brief` to display brief packet information.
detail	(OPTIONAL) Enter the keyword `detail` to display detailed packet information.
tx	(OPTIONAL) Enter the keyword `tx` to display transmit-only packet information.
rx	(OPTIONAL) Enter the keyword `rx` to display receive-only packet information.
both	(OPTIONAL) Enter the keyword `both` to display both receive and transmit packet information.

Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

disable

Enable or disable LLDP.

S6000

Syntax

```
disable
```

To enable LLDP, use the `no disable` command.

Defaults	Enabled, that is no disable.
Command Modes	CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.

Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands

protocol lldp (Configuration) — enables LLDP globally.

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

hello

Configure the rate at which the LLDP control packets are sent to its peer.

S6000

Syntax

`hello seconds`

To revert to the default, use the `no hello seconds` command.

Parameters

seconds	Enter the rate, in seconds, at which the control packets are sent to its peer. The rate is from 5 to 180 seconds. The default is **30 seconds**.

Defaults **30 seconds**

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

mode

To receive or transmit, set LLDP.

S6000

Syntax

`mode {tx | rx}`

To return to the default, use the `no mode {tx | rx}` command.

Parameters

tx	Enter the keyword `tx` to set the mode to transmit.
rx	Enter the keyword `rx` to set the mode to receive.

Defaults

Both **transmit** and **receive**.

Command Modes

CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands

protocol lldp (Configuration) — enables LLDP globally.

show lldp neighbors — displays the LLDP neighbors.

multiplier

Set the number of consecutive misses before LLDP declares the interface dead.

S6000

Syntax

`multiplier *integer*`

To return to the default, use the `no multiplier *integer*` command.

Parameters

integer	Enter the number of consecutive misses before the LLDP declares the interface dead. The range is from 2 to 10.

Defaults **4 x hello**

Command Modes CONFIGURATION (conf-lldp) and INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

protocol lldp (Configuration)

Enable the LLDP globally on the switch.

S6000

Syntax `protocol lldp`

To disable LLDP globally on the chassis, use the `no protocol lldp` command.

Defaults Enabled.

Command Modes CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

protocol lldp (Interface)

Enter the LLDP protocol in INTERFACE mode.

S6000

Syntax

`[no] protocol lldp`

To return to the global LLDP configuration mode, use the `no protocol lldp` command from Interface mode.

Defaults

LLDP is not enabled on the interface.

Command Modes

INTERFACE (conf-if-*interface*-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

Before LLDP can be configured on an interface, it must be enabled globally from CONFIGURATION mode. This command places you in LLDP mode on the interface; it does not enable the protocol.

When you enter the `LLDP` protocol in the Interface context, it overrides global configurations. When you execute the `no protocol lldp` from INTERFACE mode, interfaces begin to inherit the configuration from global LLDP CONFIGURATION mode.

show lldp neighbors

Display LLDP neighbor information for all interfaces or a specified interface.

S6000

Syntax	`show lldp neighbors [interface] [detail]`

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/ port information. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `tenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
detail	(OPTIONAL) Enter the keyword `detail` to display all the TLV information, remote management IP addresses, timers, and LLDP tx and rx counters.

Defaults	none
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.1. (0.0)	Modified output of detail parameter to display remote management IP addresses.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

Omitting the keyword `detail` displays only the remote chassis ID, Port ID, and Dead Interval.

Example

```
R1(conf-if-gi-1/31)#do show lldp neighbors
Loc PortID Rem  Host Name       Rem     Port Id Rem Chassis Id
--------------------------------------------------------------
Gi 1/21    R2  GigabitEthernet  2/11   00:01:e8:06:95:3e
Gi 1/31    R3  GigabitEthernet  3/11   00:01:e8:09:c2:4a
```

show lldp statistics

Display the LLDP statistical information.

S6000

Syntax

```
show lldp statistics
```

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Example

```
Dell#show lldp statistics
Total number of neighbors: 300
Last table change time    :   Mon Oct 02 16:00:52 2006
Number of Table Inserts  :   1621
Number of Table Deletes  :   200
Number of Table Drops    :   0
Number of Table Age Outs :   400
Dell#
```

LLDP-MED Commands

The following are the LLDP-MED (Media Endpoint Discovery) commands.

Dell Networking OS LLDP-MED commands are an extension of the set of LLDP TLV advertisement commands. The C-Series and S-Series support all commands.

The E-Series generally supports the commands. However, LLDP-MED commands are more useful on the C-Series and the S50V model of the S-Series, because they support Power over Ethernet (PoE) devices.

As defined by ANSI/TIA-1057, LLDP-MED provides organizationally specific TLVs (Type Length Value), so that endpoint devices and network connectivity devices can advertise their characteristics and configuration information. The Organizational Unique Identifier (OUI) for the Telecommunications Industry Association (TIA) is 00-12-BB.

- LLDP-MED Endpoint Device — any device that is on an IEEE 802 LAN network edge, can communicate using IP, and uses the LLDP-MED framework.
- LLDP-MED Network Connectivity Device — any device that provides access to an IEEE 802 LAN to an LLDP-MED endpoint device, and supports IEEE 802.1AB (LLDP) and TIA-1057 (LLDP-MED). The Dell Networking system is an LLDP-MED network connectivity device.

Regarding connected endpoint devices, LLDP-MED provides network connectivity devices with the ability to:

- manage inventory
- manage Power over Ethernet (POE)
- identify physical location
- identify network policy

advertise med guest-voice

To advertise a separate limited voice service for a guest user with their own IP telephony handset or other appliances that support interactive voice services, configure the system.

S6000

Syntax

```
advertise med guest-voice {vlan-id layer2_priority DSCP_value}
| {priority-tagged number}
```

To return to the default, use the `no advertise med guest-voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` followed the Layer 2 priority. The range is from 0 to 7.

Defaults

Unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

protocol lldp (Configuration) — enables LLDP globally.

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise med guest-voice-signaling

To advertise a separate limited voice service for a guest user when the guest voice control packets use a separate network policy than the voice data, configure the system.

S6000

Syntax

`advertise med guest-voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med guest-voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority. The range is from 0 to 7.
DSCP_value	Enter the DSCP value. The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` then the Layer 2 priority. The range is from 0 to 7.

Defaults

unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise med location-identification

To advertise a location identifier, configure the system.

S6000

Syntax

`advertise med location-identification {coordinate-based value | civic-based value | ecs-elin value}`

To return to the default, use the `no advertise med location-identification {coordinate-based value | civic-based value | ecs-elin value}` command.

Parameters

coordinate-based *value*	Enter the keywords `coordinate-based` then the coordinated based location in hexadecimal value of 16 bytes.
civic-based *value*	Enter the keywords `civic-based` then the civic based location in hexadecimal format. The range is from 6 to 255 bytes.
ecs-elin *value*	Enter the keywords `ecs-elin` then the Emergency Call Service (ecs) Emergency Location Identification Number (elin) numeric location string. The range is from 10 to 25 characters.

Defaults

unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Usage Information

- ECS — Emergency call service such as defined by TIA or the national emergency numbering association (NENA)
- ELIN — Emergency location identification number, a valid North America Numbering Plan format telephone number supplied for ECS purposes.

Related Commands

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise med power-via-mdi

To advertise the Extended Power via MDI TLV, configure the system.

S6000

Syntax

```
advertise med power-via-mdi
```

To return to the default, use the `no advertise med power-via-mdi` command.

Defaults

unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.

Usage Information	Advertise the Extended Power via MDI on all ports that are connected to an 802.3af powered, LLDP-MED endpoint device.
Related Commands	debug lldp interface — debugs LLDP. show lldp neighbors — displays the LLDP neighbors.

advertise med softphone-voice

To advertise softphone to enable IP telephony on a computer so that the computer can be used as a phone, configure the system.

S6000

Syntax

`advertise med softphone-voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med softphone-voice {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority (C-Series and E-Series only). The range is from 0 to 7.
DSCP_value	Enter the DSCP value (C-Series and E-Series only). The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` then the Layer 2 priority. The range is from 0 to 7.

Defaults	unconfigured.
Command Modes	CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise med streaming-video

To advertise streaming video services for broadcast or multicast-based video, configure the system. This command does not include video applications that rely on TCP buffering.

S6000

Syntax

`advertise med streaming-video {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med streaming-video {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority (C-Series and E-Series only). The range is from 0 to 7.
DSCP_value	Enter the DSCP value (C-Series and E-Series only). The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` then the Layer 2 priority. The range is from 0 to 7.

Defaults

unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise med video-conferencing

To advertise dedicated video conferencing and other similar appliances that support real-time interactive video, configure the system.

S6000

Syntax

`advertise med video-conferencing {vlan-id layer2_priority DSCP_value} | {priority-tagged number}`

To return to the default, use the `no advertise med video-conferencing {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority (C-Series and E-Series only). The range is from 0 to 7.
DSCP_value	Enter the DSCP value (C-Series and E-Series only). The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` then the Layer 2 priority. The range is from 0 to 7.

Defaults

unconfigured.

Command Modes

CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise med video-signaling

To advertise video control packets that use a separate network policy than video data, configure the system.

S6000

Syntax	`advertise med video-signaling {`*`vlan-id layer2_priority DSCP_value`*`} | {priority-tagged `*`number`*`}` To return to the default, use the `no advertise med video-signaling {`*`vlan-id layer2_priority DSCP_value`*`} | {priority-tagged `*`number`*`}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority (C-Series and E-Series only). The range is from 0 to 7.
DSCP_value	Enter the DSCP value (C-Series and E-Series only). The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` then the Layer 2 priority. The range is from 0 to 7.

Defaults	unconfigured.
Command Modes	CONFIGURATION (conf-lldp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands

debug lldp interface — debugs LLDP.

show lldp neighbors — displays the LLDP neighbors.

advertise med voice

To advertise a dedicated IP telephony handset or other appliances supporting interactive voice services, configure the system.

S6000

Syntax	`advertise med voice {`*`vlan-id layer2_priority DSCP_value`*`} | {priority-tagged `*`number`*`}` To return to the default, use the `no advertise med voice {`*`vlan-id layer2_priority DSCP_value`*`} | {priority-tagged `*`number`*`}` command.
Parameters	
Defaults	unconfigured.
Command Modes	CONFIGURATION (conf-lldp)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.
Related Commands	debug lldp interface — debugs LLDP. show lldp neighbors — displays the LLDP neighbors.

Parameters:

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority (C-Series and E-Series only). The range is from 0 to 7.
DSCP_value	Enter the DSCP value (C-Series and E-Series only). The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` then the Layer 2 priority. The range is from 0 to 7.

Command History:

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

advertise med voice-signaling

To advertise when voice control packets use a separate network policy than voice data, configure the system.

S6000

Syntax	`advertise med voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` To return to the default, use the `no advertise med voice-signaling {vlan-id layer2_priority DSCP_value} | {priority-tagged number}` command.

Parameters

vlan-id	Enter the VLAN ID. The range is from 1 to 4094.
layer2_priority	Enter the Layer 2 priority (C-Series and E-Series only). The range is from 0 to 7.
DSCP_value	Enter the DSCP value (C-Series and E-Series only). The range is from 0 to 63.
priority-tagged *number*	Enter the keywords `priority-tagged` then the Layer 2 priority. The range is from 0 to 7.

Defaults	unconfigured.
Command Modes	CONFIGURATION (conf-lldp)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series and E-Series.

Related Commands	debug lldp interface — debugs LLDP. show lldp neighbors — displays the LLDP neighbors.

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Microsoft Network Load Balancing

This functionality is supported on the S6000 platform.

Network Load Balancing (NLB) is a clustering functionality that is implemented by Microsoft on Windows 2000 Server and Windows Server 2003 operating systems. NLB uses a distributed methodology or pattern to equally split and balance the network traffic load across a set of servers that are part of the cluster or group. NLB combines the servers into a single multicast group and attempts to use the standard multicast IP or unicast IP addresses, and MAC addresses for the transmission of network traffic. At the same time, it also uses a single virtual IP address for all clients as the destination IP address, which enables servers to join the same multicast group in a way that is transparent to the clients (the clients do not notice the addition of new servers to the group). The clients use a cluster IP address to connect to the server. The NLB functionality enables flooding of traffic over the VLAN ports (for unicast mode) or a subset of ports in a VLAN (for multicast mode) to avoid overloading and effective performance of the servers for optimal processing of data packets.

NLB functions in two modes, namely unicast mode and multicast mode. The cluster IP address and the associated cluster MAC address are configured in the NLB application running on the Windows Server. In the unicast mode, when the server IP address is attempted to be resolved to the MAC address using the ARP application, the switch determines whether the ARP reply, obtained from the server, is of an NLB type. The switch then maps the IP address (cluster IP) with the MAC address (cluster MAC address). In multicast mode, the cluster IP address is mapped to a cluster multicast MAC address that is configured using a static ARP CLI configuration command. After the NLB entry is learned, the traffic is forwarded to all the servers in the VLAN corresponding to the cluster virtual IP address.

NLB Unicast Mode Scenario

Consider a sample topology in which four servers, namely S1 through S4, are configured as a cluster or a farm. This set of servers is connected to a Layer 3 switch, which in turn is connected to the end-clients. The servers contain a single IP address (IP-cluster address of 172.16.2.20) and a single unicast MAC address (MAC-Cluster address of 00-bf-ac-10-00-01) for load-balancing. Because multiple ports of a switch cannot learn a single MAC address, the servers are assigned with MAC addresseses of MAC-s1 to MAC-s4) respectively on S1 through S4 in addition to the MAC cluster address. All the servers of the cluster belong to the VLAN named VLAN1.

In unicast NLB mode, the following sequence of events occurs:

- The switch sends an ARP request to resolve the IP address to the cluster MAC address.
- The ARP servers send an ARP response with the MAC cluster address in the ARP header and a MAC address of MAC-s1/s2/s3/s4 (for servers S1 through S4) in the Ethernet header.
- The switch associates the IP address with the MAC cluster address with the last ARP response it obtains. Assume that in this case, the last ARP reply is obtained from MAC-s4.(assuming that the ARP

response with MAC-s4 is received as the last one). The interface associated with server, S4, is added to the ARP table.

- With NLB feature enabled, after learning the NLB ARP entry, all the subsequent traffic is flooded on all ports in VLAN1.

With NLB, the data frame is forwarded to all the servers for them to perform load-balancing.

NLB Multicast Mode Scenario

Consider a sample topology in which four servers, namely S1 through S4, are configured as a cluster or a farm. This set of servers is connected to a Layer 3 switch, which in turn is connected to the end-clients. They contain a single multicast MAC address (MAC-Cluster: 03-00-5E-11-11-11).

In the multicast NLB mode, a static ARP configuration command is configured to associate the cluster IP address with a multicast cluster MAC address.

With multicast NLB mode, the data is forwarded to all the servers based on the port specified using the Layer 2 multicast command, which is the `mac-address-table static <multicast_mac> multicast vlan <vlan_id> output-range <port1>, <port2>` command in CONFIGURATION mode.

Limitations With Enabling NLB on Switches

The following limitations apply to switches on which you configure NLB:

- The NLB unicast mode uses switch flooding to transmit all packets to all the servers that are part of the VLAN. When a large volume of traffic is processed, the clustering performance might be impacted in a small way. This limitation is applicable to switches that perform unicast flooding in the software.
- The `ip vlan-flooding` command applies globally across the system and for all VLANs. In cases where the NLB is applicable and the ARP replies contain a discrepancy in the Ethernet SHA and ARP header SHA frames, a flooding of packets over the relevant VLAN occurs.
- The maximum number of concurrent clusters that is supported is eight.

Benefits and Working of Microsoft Clustering

Microsoft clustering allows multiple servers using Microsoft Windows to be represented by one MAC address and IP address in order to provide transparent failover or balancing. Dell Networking OS does not recognize server clusters by default; it must be configured to do so. When an ARP request is sent to a server cluster, either the active server or all the servers send a reply, depending on the cluster configuration. If the active server sends a reply, the Dell switch learns the active server’s MAC address. If all servers reply, the switch registers only the last received ARP reply, and the switch learns one server’s actual MAC address; the virtual MAC address is never learned. Because the virtual MAC address is never learned, traffic is forwarded to only one server rather than the entire cluster, and failover and balancing are not preserved.

To preserve failover and balancing, the switch forwards the traffic destined for the server cluster to all member ports in the VLAN connected to the cluster. To ensure that this happens, you must configure the `ip vlan-flooding` command on the Dell switch at the time that the Microsoft cluster is configured. The server MAC address is given in the Ethernet frame header of the ARP reply, while the virtual MAC address representing the cluster is given in the payload. Then, all the traffic destined for the cluster is flooded out of all member ports. Since all the servers in the cluster receive traffic, failover and balancing are preserved.

Enable and Disable VLAN Flooding

- The older ARP entries are overwritten whenever newer NLB entries are learned.
- All ARP entries, learned after the feature is enabled, are deleted when the feature is disabled, and RP2 triggers an ARP resolution. The feature is disabled with the `no ip vlan-flooding` command.
- When a port is added to the VLAN, the port automatically receives traffic if the feature is enabled. Old ARP entries are not deleted or updated.
- When a member port is deleted, its ARP entries are also deleted from the CAM.
- Port channels in the VLAN also receive traffic.
- There is no impact on the configuration from saving the configuration.
- The feature, if enabled, is displayed in the `show running-config` command output that displays the `ip vlan-flooding` CLI configuration. Apart from it, there is no indication of the enabling of this capability.

arp (for Multicast MAC Address)

To associate an IP address with a multicast MAC address in the switch when you configure multicast mode of network load balancing (NLB), use address resolution protocol (ARP).

Syntax

`arp` *`ip-address multicast-mac-address interface`*

To remove an ARP address, use the `no arp ip-address` command.

Parameters

ip-address	Enter an IP address in dotted decimal format.
multicast-mac-address	Enter a 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format for the static MAC address to be used to switch multicast traffic.
interface	Enter any of the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.

- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- The interface specified here must be one of the interfaces configured using the `{output-range | output}` *`interface`* option with the `mac-address-table static` command.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

Version 9.3(0.0)	Added support for association of an IP address with multicast MAC address on the S4810, S4820T, S6000, and Z9000 platforms.

Usage Information For multicast mode of NLB, to associate an IP address with a multicast MAC address in the switch, use address resolution protocol (ARP) by entering the `arp` *`ip-address multicast-mac-address`* command in Global configuration mode. This setting causes the multicast MAC address to be mapped to the cluster IP address for NLB mode of operation of the switch.

Related Commands clear arp-cache — clears dynamic ARP entries from the ARP table.

show arp — displays the ARP table.

ip vlan-flooding

Enable unicast data traffic flooding on VLAN member ports.

Syntax `ip vlan-flooding`

To disable, use the `no ip vlan-flooding` command.

Command Modes CONFIGURATION

Command History

Version 9.3(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL platforms

Default Disabled

Usage Information By default this command is disabled. There might be some ARP table entries which are resolved through ARP packets which had Ethernet MAC SA different from MAC information inside the ARP packet. This unicast data traffic flooding occurs only for those packets which use these ARP entries.

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Multicast Source Discovery Protocol (MSDP)

Multicast source discovery protocol (MSDP) connects multiple PIM Sparse-Mode (PIM-SM) domains together.

MSDP peers connect using TCP port 639. Peers send keepalives every 60 seconds. A peer connection is reset after 75 seconds if no MSDP packets are received. MSDP connections are parallel with MBGP connections.

The Dell Networking operating system supports MSDP commands on the S6000 platform.

clear ip msdp peer

Reset the TCP connection to the peer and clear all the peer statistics.

S6000

Syntax	`clear ip msdp peer {peer address}`
Parameters	**peer address** Enter the peer address in a dotted decimal format (A.B.C.D.)
Defaults	Not configured.
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.
Version 6.2.1.1	Introduced

clear ip msdp sa-cache

Clears the entire source-active cache, the source-active entries of a particular multicast group, rejected, or local source-active entries.

S6000

Syntax	`clear ip msdp sa-cache [`*`group-address`*` | rejected-sa | local]`

Parameters

group-address	Enter the group IP address in dotted decimal format (A.B.C.D.).
rejected-sa	Enter the keywords `rejected-sa` to clear the cache source-active entries that are rejected because the RPF check failed, an SA filter or limit is configured, the RP or MSDP peer is unreachable, or because of a format error.
local	Enter the keyword `local` to clear out local PIM advertised entries. It applies the redistribute filter (if present) while adding the local PIM SA entries to the SA cache.

Defaults	Without any options, this command clears the entire source-active cache.
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.
Version 7.8.1.0	Added the `local` option.
Version 7.7.1.0	Added the `rejected-sa` option.
Version 6.2.1.1	Introduced

clear ip msdp statistic

Clears the entire source-active cache, the source-active entries of a particular multicast group, rejected, or local source-active entries.

S6000

Syntax	`clear ip msdp sa-cache [`*`group-address`*` | rejected-sa | local]`

Parameters

group-address	Enter the group IP address in dotted decimal format (A.B.C.D.).
rejected-sa	Enter the keyword `rejected-sa` to clear the cache source-active entries that are rejected because the RPF check failed, an SA filter or limit is configured, the RP or MSDP peer is unreachable, or because of a format error.
local	Enter the keyword `local` to clear out local PIM advertised entries. It applies the redistribute filter (if present) while adding the local PIM SA entries to the SA cache.

Defaults	Without any options, this command clears the entire source-active cache.
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.
Version 7.8.1.0	Added the `local` option.
Version 7.7.1.0	Added the `rejected-sa` option.
Version 6.2.1.1	Introduced

ip msdp cache-rejected-sa

Enable an MSDP cache for the rejected source-active entries.

S6000

Syntax	`ip msdp cache-rejected-sa {number}` To clear the MSDP rejected source-active entries, use the `no ip msdp cache-rejected-sa {number}` command then the `ip msdp cache-rejected-sa {number}` command.
Parameters	*number* — Enter the number of rejected SA entries to cache. The range is from 0 to 32766.
Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.4.1.0	Introduced

Related Commands: show ip msdp sa-cache rejected-sa

ip msdp default-peer

Define a default peer from which to accept all source-active (SA) messages.

S6000

Syntax	`ip msdp default-peer peer address [list name]` To remove the default peer, use the `no ip msdp default-peer {peer address} list name` command.

Parameters

peer address	Enter the peer address in a dotted decimal format (A.B.C.D.)
list *name*	Enter the keywords `list name` and specify a standard access list that contains the RP address that should be treated as the default peer. If no access list is specified, then all SAs from the peer are accepted.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added the `list` option and removed the `prefix-list` option.
Version 7.4.1.0	Introduced

Usage Information

If a list is not specified, all SA messages received from the default peer are accepted. You can enter multiple `default peer` commands.

ip msdp log-adjacency-changes

Enable logging of MSDP adjacency changes.

S6000

Syntax

`ip msdp log-adjacency-changes`

To disable logging, use the `no ip msdp log-adjacency-changes` command.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.2.1.1	Introduced

ip msdp mesh-group

To be a member of a mesh group, configure a peer.

S6000

Syntax

`ip msdp mesh-group {name} {peer address}`

To remove the peer from a mesh group, use the `no ip msdp mesh-group {name} {peer address}` command.

Parameters

name	Enter a string of up to 16 characters long for as the mesh group name.
peer address	Enter the peer address in a dotted decimal format (A.B.C.D.).

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.2.1.1	Introduced

Usage Information

An MSDP mesh group is a mechanism for reducing SA flooding, typically in an intra-domain setting. When some subset of a domain’s MSDP speakers are fully meshed, they can be configured into a mesh-group. If member X of a mesh-group receives a SA message from an MSDP peer that is also a member of the mesh-group, member X accepts the SA message and forwards it to all of its peers that are not part of the mesh-group. However, member X cannot forward the SA message to other members of the mesh-group.

ip msdp originator-id

Configure the MSDP Originator ID.

S6000

Syntax `ip msdp originator-id {interface}`

To remove the originator-id, use the `no ip msdp originator-id {interface}` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 6.2.1.1	Introduced

ip msdp peer

Configure an MSDP peer.

S6000

Syntax

`ip msdp peer` *`peer address`* `[connect-source] [description] [sa-limit` *`number`*`]`

To remove the MSDP peer, use the `no ip msdp peer` *`peer address`* `[connect-source interface] [description` *`name`*`] [sa-limit` *`number`*`]` command.

Parameters

peer address	Enter the peer address in a dotted decimal format (A.B.C.D.).
connect-source *interface*	Enter the keywords `connect-source` then one of the interfaces and slot/port or number information: • For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/ port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.
description name	(OPTIONAL) Enter the keyword *description* then a description name (maximum 80 characters) to designate a description for the MSDP peer.
sa-limit *number*	(OPTIONAL) Enter the maximum number of SA entries in SA-cache. The range is from 1 to 500000. The default it **500000**.

Defaults As described in the *Parameters* section.

Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 7.5.1.0	Added option for SA upper limit and the `description` option.
Version 6.2.1.1	Introduced

Usage Information

The `connect-source` option is used to supply a source IP address for the TCP connection. When an interface is specified using the `connect-source` option, the primary configured address on the interface is used.

If the total number of SA messages received from the peer is already larger than the limit when this command is applied, those SA messages continue to be accepted. To enforce the limit in such situation, use the `clear ip msdp peer` command to reset the peer.

Related Commands

ip msdp sa-limit — configures the MSDP SA Limit.

clear ip msdp peer — clears the MSDP peer.

show ip msdp — displays the MSDP information.

ip msdp redistribute

Filter local PIM SA entries in the SA cache. SAs which the ACL denies time out and are not refreshed. Until they time out, they continue to reside in the MSDP SA cache.

S6000

Syntax `ip msdp redistribute [list *acl-name*]`

Parameters	

list *acl-name*	Enter the name of an extended ACL that contains permitted SAs. If you do not use this option, all local entries are blocked.

Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced

Usage Information	Modifications to the ACL do not have an immediate effect on the sa-cache. To apply the redistribute filter to entries already present in the SA cache, use the `clear ip msdp sa-cache local` command.

ip msdp sa-filter

Permit or deny MSDP source active (SA) messages based on multicast source and/or group from the specified peer.

S6000

Syntax	`ip msdp sa-filter {in | out} peer-address list [access-list name]` Remove this configuration using the `no ip msdp sa-filter {in | out} peer address list [access-list name]` command.
Parameters	

in	Enter the keyword `in` to enable incoming SA filtering.
out	Enter the keyword `out` to enable outgoing SA filtering.
peer-address	Enter the peer address of the MSDP peer in a dotted decimal format (A.B.C.D.).

access-list name	Enter the name of an extended ACL that contains permitted SAs. If you do not use this option, all local entries are blocked.

Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the E-Series.

ip msdp sa-limit

Configure the upper limit of source-active (SA) entries in SA-cache.

S6000

Syntax

`ip msdp sa-limit number`

To return to the default, use the `no ip msdp sa-limit number` command.

Parameters

number	Enter the maximum number of SA entries in SA-cache. The range is from 0 to 40000.

Defaults	**50000**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.5.1.0	Introduced on the E-Series.

Usage Information

Dell Networking OS counts the SA messages originated by itself and those messages received from the MSDP peers. When the total SA messages reach this limit, the subsequent SA messages are dropped (even if they pass RPF checking and policy checking).

If the total number of SA messages is already larger than the limit when this command is applied, those SA messages that are already in Dell Networking OS continue to be accepted. To enforce the limit in such situation, use the `clear ip msdp sa-cache` command.

Related Commands

[ip msdp peer](#) — configures the MSDP peer.

[clear ip msdp peer](#) — clears the MSDP peer.

[show ip msdp](#) — displays the MSDP information

ip msdp shutdown

Administratively shut down a configured MSDP peer.

S6000

Syntax `ip msdp shutdown {peer address}`

Parameters

peer address	Enter the peer address in a dotted decimal format (A.B.C.D.).

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.2.1.1	Introduced

ip multicast-msdp

Enable MSDP.

S6000

Syntax	`ip multicast-msdp` To exit MSDP, use the `no ip multicast-msdp` command.
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.2.1.1	Introduced

show ip msdp

Display the MSDP peer status, SA cache, or peer summary.

S6000

Syntax

```
show ip msdp {peer peer address | sa-cache | summary}
```

Parameters

peer *peer address*	Enter the keyword `peer` then the peer address in a dotted decimal format (A.B.C.D.).

sa-cache	Enter the keywords `sa-cache` to display the Source-Active cache.
summary	Enter the keyword `summary` to display an MSDP peer summary.

Defaults Not configured.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.2.1.1	Introduced

Example

```
Dell#show ip msdp peer 100.1.1.1

Peer Addr: 100.1.1.1
  Local Addr: 100.1.1.2(639) Connect Source: none
  State: Established Up/Down Time: 00:00:08
  Timers: KeepAlive 60 sec, Hold time 75 sec
  SourceActive packet count (in/out): 0/0
  SAs learned from this peer: 0
  SA Filtering:
  Input (S,G) filter: none
  Output (S,G) filter: none
Dell#
```

Example (Sa-cache)

```
Dell#show ip msdp sa-cache
MSDP Source-Active Cache - 1 entries
GroupAddr  SourceAddr     RPAddr        LearnedFrom Expire
UpTime
224.1.1.1  172.21.220.10  172.21.3.254  172.21.3.254 102
00:02:52
Dell#
```

Example (Summary)

```
Dell#show ip msdp summary
Peer Addr  Local Addr State      Source SA  Up/Down Description
72.30.1.2  72.30.1.1  Established  none 0  00:00:03 peer1
72.30.2.2  72.30.2.1  Established  none 0  00:00:03 peer2
72.30.3.2  72.30.3.1  Established  none 0  00:00:02 test-peer-3
Dell#
```

show ip msdp sa-cache rejected-sa

Display the rejected SAs in the SA cache.

S6000

Syntax

`show ip msdp sa-cache rejected-sa`

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.
Version 7.4.1.0	Introduced.

Example

```
Dell#sh ip msdp sa-cache rejected-sa
MSDP Rejected SA Cache 200 rejected SAs received, cache-size
1000
UpTime   GroupAddr SourceAddr RPAddr    LearnedFrom Reason
00:00:13 225.1.2.1 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.2 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.3 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.4 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.5 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.6 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.7 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.8 10.1.1.4   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.9 10.1.1.3   110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.10 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.11 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.11 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.12 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.13 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.14 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.15 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.16 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.17 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.18 10.1.1.4  110.1.1.1 13.1.1.2 Rpf-Fail
00:00:13 225.1.2.19 10.1.1.3  110.1.1.1 13.1.1.2 Rpf-Fail
Dell#
```

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Multiple Spanning Tree Protocol (MSTP)

Multiple spanning tree protocol (MSTP), as implemented by the Dell Networking operating system, conforms to IEEE 802.1s.

This command supports the Dell Networking S6000 platform.

debug spanning-tree mstp

Enable debugging of the multiple spanning tree protocol and view information on the protocol.

S6000

Syntax

```
debug spanning-tree mstp [all | bpdu interface {in | out} |
events]
```

To disable debugging, enter **no debug spanning-tree** mstp

Parameters

all	(OPTIONAL) Enter the keyword all to debug `all` spanning tree operations.
bpdu **`interface`** {in | out}	(OPTIONAL) Enter the keyword `bpdu` to debug bridge protocol data units (BPDU). (OPTIONAL) Enter the interface keyword along with the type slot/port of the interface you want displayed. Type slot/port options are the following: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. Optionally, enter an `in` or `out` parameter with the optional interface: • For Receive, enter the keyword `in`. • For Transmit, enter the keyword `out`.
events	(OPTIONAL) Enter the keyword `events` to debug MSTP events.

Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell#debug spanning-tree mstp bpdu gigabitethernet 2/0 ?
in Receive (in)
out Transmit (out)
```

disable

Globally disable the multiple spanning tree protocol on the switch.

S6000

Syntax

`disable`

To enable MSTP, enter the `no disable` command.

Defaults	disabled.
Command Modes	MULTIPLE SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced.

Related Commands

protocol spanning-tree mstp — enters MULTIPLE SPANNING TREE mode.

forward-delay

The amount of time the interface waits in the Blocking State and the Learning State before transitioning to the Forwarding State.

S6000

Syntax

```
forward-delay seconds
```

To return to the default setting, use the `no forward-delay` command.

Parameters

seconds	Enter the number of seconds the interface waits in the Blocking State and the Learning State before transiting to the Forwarding State. The range is from 4 to 30. The default is **15 seconds**.

Defaults

15 seconds

Command Modes

MULTIPLE SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced.

Related Commands

max-age — changes the wait time before MSTP refreshes protocol configuration information.

hello-time — changes the time interval between bridge protocol data units (BPDUs).

hello-time

Set the time interval between generation of MSTB bridge protocol data units (BPDUs).

S6000

Syntax

```
hello-time seconds
```

To return to the default value, use the `no hello-time` command.

Parameters

seconds	Enter a number as the time interval between transmission of BPDUs. The range is from 1 to 10. The default is **2 seconds**.

Defaults

2 seconds

Command Modes

MULTIPLE SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced.

Related Commands

forward-delay — the amount of time the interface waits in the Blocking State and the Learning State before transitioning to the Forwarding State.

max-age — changes the wait time before MSTP refreshes protocol configuration information.

max-age

To maintain configuration information before refreshing that information, set the time interval for the MSTB.

S6000

Syntax	`max-age seconds` To return to the default values, use the `no max-age` command.
Parameters	*max-age* — Enter a number of seconds the Dell Networking OS waits before refreshing configuration information. The range is from 6 to 40. The default is **20 seconds**.
Defaults	**20 seconds**
Command Modes	MULTIPLE SPANNING TREE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced.

Related Commands

forward-delay — the amount of time the interface waits in the Blocking State and the Learning State before transitioning to the Forwarding State.

hello-time — changes the time interval between BPDUs.

msti

Configure multiple spanning tree instance, bridge priority, and one or multiple VLANs mapped to the MST instance.

S6000

Syntax	`msti` *`instance`* `{vlan` *`range`* `| bridge-priority` *`priority`*`}` To disable mapping or bridge priority, use the `no msti` *`instance`* `{vlan` *`range`* `| bridge-priority` *`priority`*`}` command.

Parameters

msti *instance*	Enter the MSTP instance. The range is from zero (0) to 63.
vlan *range*	Enter the keyword `vlan` then the identifier range value. The range is from 1 to 4094.
bridge-priority *priority*	Enter the keywords `bridge-priority` then a value in increments of 4096 as the bridge priority. The range is from zero (0) to 61440. Valid priority values are: 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344, and 61440. All other values are rejected.

Defaults	default bridge-priority is **32768**.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced.

Usage Information	By default, all VLANs are mapped to MST instance zero (0) unless you use the `vlan` *`range`* command to map it to a non-zero instance.

name

The name you assign to the multiple spanning tree region.

S6000

Syntax

`name region-name`

To remove the region name, use the `no name` command.

Parameters

region-name	Enter the MST region name. The range is 32 character limit.

Defaults

no default name.

Command Modes

MULTIPLE SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced.

Usage Information

For two MSTP switches to be within the same MSTP region, the switches must share the same region name (including matching case).

Related Commands

msti — maps the VLAN(s) to an MST instance.

revision — assigns the revision number to the MST configuration.

protocol spanning-tree mstp

To enable and configure the multiple spanning tree group, enter MULTIPLE SPANNING TREE mode.

S6000

Syntax	`protocol spanning-tree mstp` To disable the multiple spanning tree group, use the `no protocol spanning-tree mstp` command.
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

MSTP is not enabled when you enter MULTIPLE SPANNING TREE mode. To enable MSTP globally on the switch, enter the `no disable` command while in MULTIPLE SPANNING TREE mode.

For more information about the multiple spanning tree protocol, refer to the *Dell Networking OS Configuration Guide*.

Example

```
Dell(conf)#protocol spanning-tree mstp
Dell(config-mstp)#no disable
```

Related Commands

disable — disables multiple spanning tree.

revision

The revision number for the multiple spanning tree configuration.

S6000

Syntax	`revision range` To return to the default values, use the `no revision` command.
Parameters	*range* — Enter the revision number for the MST configuration. The range is from 0 to 65535. The default is **0**.
Defaults	**0**
Command Modes	MULTIPLE SPANNING TREE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information	For two MSTP switches to be within the same MST region, the switches must share the same revision number.
Related Commands	msti — maps the VLAN(s) to an MST instance. name — assigns the region name to the MST region.

show config

View the current configuration for the mode. Only non-default values are shown.

S6000

Syntax	`show config`
Command Modes	MULTIPLE SPANNING TREE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced on the E-Series.

Example

```
Dell(conf-mstp)#show config
!
protocol spanning-tree mstp
  no disable
  name CustomerSvc
  revision 2
  MSTI 10 VLAN 101-105
  max-hops 5
Dell(conf-mstp)#
```

show spanning-tree mst configuration

View the multiple spanning tree configuration.

S6000

Syntax `show spanning-tree mst configuration`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Enable the multiple spanning tree protocol prior to using this command.

Example

```
Dell#show spanning-tree mst configuration
MST region name: CustomerSvc
Revision: 2
MSTI VID
  10 101-105
Dell#
```

show spanning-tree msti

View the multiple spanning tree instance.

S6000

Syntax

`show spanning-tree msti [instance-number [brief]] [guard]`

Parameters

instance-number	(Optional) Enter the multiple spanning tree instance number. The range is from 0 to 63.
brief	(Optional) Enter the keyword `brief` to view a synopsis of the MST instance.
guard	(Optional) Enter the keyword `guard` to display the type of guard enabled on an MSTP interface and the current port state.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.1	Support for the optional keyword `guard` was added on the C-Series, S-Series, and E-Series TeraScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Expanded to display the port error disable state (EDS) loopback BPDU inconsistency causes.

Usage Information

Enable the multiple spanning tree protocol prior to using this command.

Example

```
Dell#show spanning-tree msti 10
MSTI 10 VLANs mapped 101-105

Bridge Identifier has priority 32768, Address 0001.e802.3506
Configured hello time 2, max age 20, forward delay 15, max
hops 5
Current root has priority 16384, Address 0001.e800.0a5c
Number of topology changes 0, last change occurred 3058087

Port 82 (GigabitEthernet 2/0) is designated Forwarding
Port path cost 0, Port priority 128, Port Identifier 128.82
Designated root has priority 16384, address 0001.e800.0a:5c
Designated bridge has priority 32768, address 0001.e802.35:06
Designated port id is 128.82, designated path cost
Number of transitions to forwarding state 1
BPDU (Mrecords): sent 1109, received 0
The port is not in the portfast mode

Port 88 (GigabitEthernet 2/6) is root Forwarding
Port path cost 0, Port priority 128, Port Identifier 128.88
Designated root has priority 16384, address 0001.e800.0a:5c
Designated bridge has priority 16384, address 0001.e800.0a:5c
Designated port id is 128.88, designated path cost
Number of transitions to forwarding state 4
BPDU (Mrecords): sent 19, received 1103
The port is not in the portfast mode

Port 89 (GigabitEthernet 2/7) is alternate Discarding
Port path cost 0, Port priority 128, Port Identifier 128.89
Designated root has priority 16384, address 0001.e800.0a:5c
Designated bridge has priority 16384, address 0001.e800.0a:5c
Designated port id is 128.89, designated path cost
Number of transitions to forwarding state 3
```

```
BPDU (Mrecords): sent 7, received 1103
The port is not in the portfast mode
```

Example (EDS and LBK)

The bold line shows the loopback BPDU inconsistency (LBK_INC).

```
Dell#show spanning-tree msti 0 brief
    MSTI 0 VLANs mapped 1-4094

Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15, max
hops 20
Bridge ID Priority 32768, Address 0001.e801.6aa8
We are the root of MSTI 0 (CIST)
Configured hello time 2, max age 20, forward delay 15, max
hops 20
CIST regional root ID Priority 32768, Address 0001.e801.6aa8
CIST external path cost 0

Interface                            Designated
Name    PortID   Prio Cost Sts Cost Bridge ID      PortID
----------------------------------------------------------
Gi 0/0  128.257  128  20000 EDS 0 32768 0001.e801.6aa8 128.257

Interface
Name  Role  PortID Prio Cost Sts Cost Link-type Edge Boundary
----------------------------------------------------------
Gi 0/0 ErrDis 128.257  128 20000 EDS 0   P2P       No   No

Dell#show spanning-tree msti 0
MSTI 0 VLANs mapped 1-4094

Root Identifier has priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15, max
hops 20
Bridge Identifier has priority 32768, Address 0001.e801.6aa8
Configured hello time 2, max age 20, forward delay 15, max
hops 20
We are the root of MSTI 0 (CIST)
Current root has priority 32768, Address 0001.e801.6aa8
CIST regional root ID Priority 32768, Address 0001.e801.6aa8
CIST external path cost 0
Number of topology changes 1, last change occured 00:00:15 ago
on Gi 0/0
```

Port 257 (GigabitEthernet 0/0) is LBK_INC Discarding

```
Port path cost 20000, Port priority 128, Port Identifier
128.257
Designated root has priority 32768, address 0001.e801.6aa8
Designated bridge has priority 32768, address 0001.e801.6aa8
Designated port id is 128.257, designated path cost 0
Number of transitions to forwarding state 1
BPDU (MRecords): sent 21, received 9
The port is not in the Edge port mode
```

Usage Information

The following describes the `show spanning-tree msti 5 guard` command shown in the following example.

Field	Description
Interface Name	MSTP interface.

Field	Description
Instance	MSTP instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), or shut down (EDS Shut).
Guard Type	Type of STP guard configured (Root, Loop, or BPDU guard).

Example (Guard)

```
Dell#show spanning-tree msti 5 guard
Interface
Name    Instance  Sts Guard    type
------------------------------------
Gi 0/1  5         INCON(Root)  Rootguard
Gi 0/2  5         FWD          Loopguard
Gi 0/3  5         EDS(Shut)    Bpduguard
```

spanning-tree

Enable the multiple spanning tree protocol on the interface.

S6000

Syntax

`spanning-tree`

To disable the multiple spanning tree protocol on the interface, use the `no spanning-tree` command.

Parameters

spanning-tree	Enter the keywords `spanning-tree` to enable the MSTP on the interface.

Defaults

Enable.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

spanning-tree msti

Configure multiple spanning tree instance cost and priority for an interface.

S6000

Syntax `spanning-tree msti instance {cost cost | priority priority}`

Parameters

msti *instance*	Enter the keyword `msti` and the MST instance number. The range is from zero (0) to 63.
cost *cost*	(OPTIONAL) Enter the keyword `cost` then the port cost value. The range is from 1 to 200000. The defaults are: • 100 Mb/s Ethernet interface = **200000** • 1-Gigabit Ethernet interface = **20000** • 10-Gigabit Ethernet interface = **2000** • Port Channel interface with one 100 Mb/s Ethernet = **200000** • Port Channel interface with one 1 Gigabit Ethernet = **20000** • Port Channel interface with one 10 Gigabit Ethernet = **2000** • Port Channel with two 1 Gigabit Ethernet = **18000** • Port Channel with two 10 Gigabit Ethernet = **1800** • Port Channel with two 100 Mbps Ethernet = **180000**
priority *priority*	Enter keyword `priority` then a value in increments of 16 as the priority. The range is from 0 to 240. The default is **128**.

Defaults

- cost = depends on the interface type
- priority = **128**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced on the E-Series.

tc-flush-standard

Enable the MAC address flushing after receiving every topology change notification.

S6000

Syntax

```
tc-flush-standard
```

To disable, use the `no tc-flush-standard` command.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced

Usage Information

By default, Dell Networking OS implements an optimized flush mechanism for MSTP. This mechanism helps in flushing the MAC addresses only when necessary (and less often) allowing for faster convergence during topology changes. However, if a standards-based flush mechanism is needed, this `knob` command can be turned on to enable flushing MAC addresses after receiving every topology change notification.

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Multicast

The multicast commands are supported by Dell Networking operating system (OS) on all S6000 platform.

This chapter contains the following sections:

- IPv4 Multicast Commands

IPv4 Multicast Commands

The following section contains the IPv4 multicast commands.

clear ip mroute

Clear learned multicast routes on the multicast forwarding table. To clear the protocol-independent multicast (PIM) tree information base, use the `clear ip pim tib` command.

S6000

Syntax	`clear ip mroute {`*`group-address`*` [`*`source-address`*`] | * | snooping}`
Parameters	

group-address [source-address]	Enter the multicast group address and source address (if desired), in dotted decimal format, to clear information on a specific group.
*	Enter * to clear all multicast routes.
snooping	Enter the keyword `snooping` to delete multicast snooping route table entries.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2.(0.0)	Added support for keyword `snooping` on the Z9000, S4810, and S4820T.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

show ip pim tib — shows the PIM tree information base.

ip mroute

Assign a static mroute.

S6000

Syntax

```
ip mroute destination mask {ip-address | null 0| {{bgp| ospf}
process-id | isis | rip | static} {ip-address | tag | null 0}}
[distance]
```

To delete a specific static mroute, use the `ip mroute destination mask {ip-address | null 0| {{bgp| ospf} process-id | isis | rip | static} {ip-address | tag | null 0}} [distance]` command.

To delete all mroutes matching a certain mroute, use the `no ip mroute destination mask` command.

Parameters

destination	Enter the IP address in dotted decimal format of the destination device.
mask	Enter the mask in slash prefix formation (/x) or in dotted decimal format.
null 0	(OPTIONAL) Enter the keyword `null` then zero (0).
[*protocol* [*process-id* | *tag*] *ip-address*]	(OPTIONAL) Enter one of the routing protocols: • Enter the BGP as-number then the IP address in dotted decimal format of the reverse path forwarding (RPF) neighbor. The range is from 1 to 65535. • Enter the OSPF process identification number then the IP address in dotted decimal format of the RPF neighbor. the range is from 1 to 65535. • Enter the IS-IS alphanumeric tag string then the IP address in dotted decimal format of the RPF neighbor. • Enter the RIP IP address in dotted decimal format of the RPF neighbor.
static *ip-address*	(OPTIONAL) Enter the Static IP address in dotted decimal format of the RPF neighbor.
ip-address	(OPTIONAL) Enter the IP address in dotted decimal format of the RPF neighbor.

distance	(OPTIONAL) Enter a number as the distance metric assigned to the mroute. The range is from 0 to 255.

Defaults
Not configured.

Command Modes
CONFIGURATION

Command History
This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
E-Series legacy command	

Related Commands
show ip mroute — views the E-Series routing table.

ip multicast-limit

To limit the number of multicast entries on the system, use this feature.

S6000

Syntax
`ip multicast-limit limit`

Parameters

limit	Enter the desired maximum number of multicast entries on the system. The S-Series range is from 1 to 2000.

Defaults
The S-Series default is **400**.

Command Modes
CONFIGURATION

Command History
This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.

Version 7.8.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced on the E-Series.

Usage Information

This feature allows you to limit the number of multicast entries on the system. This number is the total of all the multicast entries on all line cards in the system. On each line card, the multicast module only installs the maximum number of entries, depending on the configured CAM profile.

To store multicast routes, use the IN-L3-McastFib CAM partition. It is a separate hardware limit that exists per port-pipe. This hardware space limitation can supersede any software-configured limit. The opposite is also true, the CAM partition might not be exhausted at the time the system-wide route limit set by the `ip multicast-limit` command is reached.

Related Commands

show ip igmp groups — shows the IGMP groups.

ip multicast-routing

Enable IP multicast forwarding.

S6000

Syntax

```
ip multicast-routing
```

To disable multicast forwarding, use the `no ip multicast-routing` command.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.
E-Series legacy command	

Usage Information

After you enable multicast, you can enable IGMP and PIM on an interface. In INTERFACE mode, enter the `ip pim sparse-mode` command to enable IGMP and PIM on the interface.

Related Commands	ip pim sparse-mode — enables IGMP and PIM on an interface.

show ip mroute

View the multicast routing table.

S6000

Syntax

```
show ip mroute [static | group-address [source-address] | count
| snooping [vlan vlan-id] [group-address [source-address]] |
summary | vlt [group-address [source-address] | count]
```

Parameters

static	(OPTIONAL) Enter the keyword `static` to view static multicast routes.
group-address [*source-address*]	(OPTIONAL) Enter the multicast group-address to view only routes associated with that group. Enter the source-address to view routes with that group-address and source-address.
count	(OPTIONAL) Enter the keyword `count` to view the number of multicast routes and packets.
snooping [vlan *vlan-id*] [*group-address* [*source-address*]]	Enter the keyword `snooping` to display information on the multicast routes PIM-SM snooping discovers. Enter a VLAN ID to limit the information displayed to the multicast routes PIM-SM snooping discovers on a specified VLAN. The VLAN ID range is from 1 to 4094. Enter a multicast group address and, optionally, a source multicast address in dotted decimal format (A.B.C.D) to limit the information displayed to the multicast routes PIM-SM snooping discovers for a specified multicast group and source.
summary	(OPTIONAL) Enter the keyword `summary` to view a summary of all routes.
vlt	(OPTIONAL) Enter the keyword `vlt` to view multicast routes with a spanned incoming interface. Enter a multicast group address in dotted decimal format (A.B.C.D) to limit the information displayed to the multicast routes for a specified multicast group and optionally a source multicast address in dotted decimal format (A.B.C.D) to limit the information displayed for a specified multicast source. Enter the keyword `count` to display the total number of multicast routes with the spanned IIF.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2.(0.0)	Added support for keyword `vlt` to the Z9000, S4810, and S4820T.
Version 8.4.1.1	Support for the keyword `snooping` and the optional `vlan vlan-id`, `group-address`, and `source-address` parameters were added on E-Series ExaScale.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example (Static)

```
Dell#show ip mroute static

Mroute: 23.23.23.0/24, interface: Lo 2
Protocol: static, distance: 0, route-map: none, last change:
00:00:23
```

Example (Snooping)

```
Dell#show ip mroute snooping

IPv4 Multicast Snooping Table

(*, 224.0.0.0), uptime 17:46:23
  Incoming vlan: Vlan 2
  Outgoing interface list:
    GigabitEthernet 4/13

(*, 225.1.2.1), uptime 00:04:16
  Incoming vlan: Vlan 2
  Outgoing interface list:
    GigabitEthernet 4/11
    GigabitEthernet 4/13

(165.87.1.7, 225.1.2.1), uptime 00:03:17
  Incoming vlan: Vlan 2
  Outgoing interface list:
    GigabitEthernet 4/11
    GigabitEthernet 4/13
    GigabitEthernet 4/20
```

Example (VLT)

```
Dell#show ip mroute vlt
IP Multicast Routing Table
Flags: S - Synced
(*, 225.1.1.1), uptime 00:39:33 flags: S
Incoming interface: Vlan 10
Spanned outgoing interface list:
 Vlan 20 (S)
Vlan 30

(50.1.1.2, 225.1.1.1), uptime 00:39:33 flags: S
Incoming interface: Vlan 10
Spanned outgoing interface list:
Vlan 20 (S)
```

Usage Information

The following describes the `show ip mroute` command shown in the following example.

Field	Description
(S, G)	Displays the forwarding entry in the multicast route table.
uptime	Displays the amount of time the entry has been in the multicast forwarding table.
Incoming interface	Displays the reverse path forwarding (RPF) information towards the source for (S,G) entries and the RP for (*,G) entries.
Outgoing interface list:	Lists the interfaces that meet one of the following: • a directly connected member of the Group • statically configured member of the Group • received a (*,G) or (S,G) Join message

Example

```
Dell#show ip mroute

IP Multicast Routing Table

(*, 224.10.10.1), uptime 00:05:12
  Incoming interface: GigabitEthernet 3/12
  Outgoing interface list:
    GigabitEthernet 3/13

(1.13.1.100, 224.10.10.1), uptime 00:04:03
  Incoming interface: GigabitEthernet 3/4
  Outgoing interface list:
    GigabitEthernet 3/12
    GigabitEthernet 3/13

(*, 224.20.20.1), uptime 00:05:12
  Incoming interface: GigabitEthernet 3/12
  Outgoing interface list:
    GigabitEthernet 3/4
```

show ip rpf

View reverse path forwarding.

S6000

Syntax `show ip rpf`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.
E-Series legacy command	

Usage Information

Network administrators use static mroutes to control the reach-ability of the multicast sources. If a PIM-registered multicast source is reachable using static mroute as well as unicast route, the distance of each route is examined and the route with shorter distance is the one the PIM selects for reach-ability.

NOTE: The default distance of mroutes is zero (0) and is CLI configurable on a per route basis.

Example

```
Dell#show ip rpf
RPF information for 10.10.10.9
  RPF interface: Gi 3/4
  RPF neighbor: 165.87.31.4
  RPF route/mask: 10.10.10.9/255.255.255.255
  RPF type: unicast
```

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Open Shortest Path First (OSPFv2 and OSPFv3)

Open Shortest Path First version 2 for IPv4 is supported on S6000 Dell Networking Operating System (OS) platform. Open Shortest Path First version 3 (OSPFv3) for IPv6 is supported on the platform.

OSPF is an Interior Gateway Protocol (IGP), which means that it distributes routing information between routers in a single Autonomous System (AS). OSPF is also a link-state protocol in which all routers contain forwarding tables derived from information about their links to their neighbors.

The fundamental mechanisms of OSPF (flooding, DR election, area support, SPF calculations, and so on) are the same for OSPFv2 and OSPFv3. OSPFv3 runs on a per-link basis instead of on a per-IP-subnet basis.

This chapter is divided into two sections. There is no overlap between the two sets of commands. You cannot use an OSPFv2 command in the IPv6 OSPFv3 mode.

- OSPFv2 Commands

NOTE: Dell Networking Operating System (OS) version 7.8.1.0 introduces Multi-Process OSPF on IPv4 (OSPFv2) only. It is not supported on OSPFv3 (IPv6).

The CLI requires that you include the Process ID when entering ROUTER-OSPF mode. Each command entered applies to the specified OSPFv2 process only.

OSPFv2 Commands

The Dell Networking implementation of OSPFv2 is based on IETF RFC 2328. .

area default-cost

Set the metric for the summary default route the area border router (ABR) generates into the stub area. Use this command on the border routers at the edge of a stub area.

S6000

Syntax

`area area-id default-cost cost`

To return default values, use the `no area area-id default-cost` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
cost	Specifies the stub area’s advertised external route metric. The range is from zero (0) to 65535.

Defaults	*cost* = **1**; no areas are configured.
Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	In the Dell Networking operating software (OS), `cost` is defined as reference bandwidth/bandwidth.
Related Commands	area stub — creates a stub area.

area nssa

Specify an area as a not so stubby area (NSSA).

S6000

Syntax

```
area area-id nssa [default-information-originate] [no-redistribution] [no-summary]
```

To delete an NSSA, use the `no area area-id nssa` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
no-redistribution	(OPTIONAL) Specify that the `redistribute` command does not distribute routes into the NSSA. Only use this command in an NSSA area border router (ABR).
default-information-originate	(OPTIONAL) Allows external routing information to be imported into the NSSA by using Type 7 default.

no-summary	(OPTIONAL) Specify that no summary LSAs should be sent into the NSSA.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

area range

Summarize routes matching an address/mask at an area border router (ABR).

S6000

Syntax `area area-id range ip-address mask [not-advertise]`

To disable route summarization, use the `no area area-id range ip-address mask` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
ip-address	Specify an IP address in dotted decimal format.
mask	Specify a mask for the destination prefix. Enter the full mask (for example, 255.255.255.0).
not-advertise	(OPTIONAL) Enter the keywords `not-advertise` to set the status to DoNotAdvertise (that is, the Type 3 summary-LSA is suppressed and the component networks remain hidden from other areas.)

Defaults	Not configured.
Command Modes	ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

Only the routes within an area are summarized, and that summary is advertised to other areas by the ABR. External routes are not summarized.

Related Commands

area stub — creates a stub area.

router ospf — enters ROUTER OSPF mode to configure an OSPF instance.

area stub

Configure a stub area, which is an area not connected to other areas.

S6000

Syntax

`area area-id stub [no-summary]`

To delete a stub area, use the `no area area-id stub` command.

Parameters

area-id	Specify the OSPF area in dotted decimal format (A.B.C.D.) or enter a number from zero (0) to 65535.
no-summary	(OPTIONAL) Enter the keywords `no-summary` to prevent the ABR from sending summary Link State Advertisements (LSAs) into the stub area.

Defaults	Disabled.

Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	To configure all routers and access servers within a stub, use this command.
Related Commands	router ospf — enters ROUTER OSPF mode to configure an OSPF instance.

auto-cost

Specify how the OSPF interface cost is calculated based on the reference bandwidth method.

S6000

Syntax

```
auto-cost [reference-bandwidth ref-bw]
```

To return to the default bandwidth or to assign cost based on the interface type, use the `no auto-cost [reference-bandwidth]` command.

Parameters

ref-bw	(OPTIONAL) Specify a reference bandwidth in megabits per second. The range is from 1 to 4294967. The default is **100 megabits per second**.

Defaults	**100 megabits per second**.
Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

clear ip ospf

Clear all OSPF routing tables.

S6000

Syntax

```
clear ip ospf process-id [vrf vrf-name] [process]
```

Parameters

process-id	Enter the OSPF Process ID to clear a specific process. If no Process ID is entered, all OSPF processes are cleared.
vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to clear all OSPF routing tables corresponding to that VRF.
process	(OPTIONAL) Enter the keyword `process` to reset the OSPF process.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

clear ip ospf statistics

Clear the packet statistics in interfaces and neighbors.

S6000

Syntax

`clear ip ospf [process-id] [vrf vrf-name] statistics [interface name {neighbor router-id}]`

Parameters

process-id	Enter the OSPF Process ID to clear a specific process. If no Process ID is entered, all OSPF processes are cleared.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to clear all OSPF routing tables corresponding to that VRF.
statistics	Enter the keyword statistics to clear the packet statistics in interfaces and neighbors.
interface *name*	(OPTIONAL) Enter the keyword `interface` then one of the following interface keywords and slot/port or number information: • For Port Channel groups, enter the keywords `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128. • For a SONET interface, enter the keyword `sonet` then the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
neighbor *router-id*	(OPTIONAL) Enter the keyword `neighbor` then the neighbor's router-id in dotted decimal format (A.B.C.D.).

Defaults

none

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

show ip ospf statistics — displays the OSPF statistics.

debug ip ospf

Display debug information on OSPF. Entering the `debug ip ospf` commands enables OSPF debugging for the first OSPF process.

S6000

Syntax

```
debug ip ospf [process-id] [vrf vrf-name] [bfd |event | packet
| spf | database-timer rate-limit]
```

To cancel the debug command, use the `no debug ip ospf` command.

Parameters

process-id	Enter the OSPF Process ID to clear a specific process. If no Process ID is entered, all OSPF processes are cleared.
vrf *vrf-name*	Enter the keyword `vrf` to view debugging information on OSPF corresponding to that VRF.
bfd	(OPTIONAL) Enter the keyword `bfd` to debug only OSPF BFD information.
event	(OPTIONAL) Enter the keyword `event` to debug only OSPF event information.
packet	(OPTIONAL) Enter the keyword `packet` to debug only OSPF packet information.
spf	(OPTIONAL) Enter the keyword `spf` to display the Shortest Path First information.
database-timer rate-limit	(OPTIONAL) Enter the keywords `database-timer rate-limit` to display the LSA throttling timer information. This applies to the S4810 platform only.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Added the `database-timer rate-limit` option for the S4810.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `debug ip ospf` command shown in the Example below.

Field	Description
8:14	Displays the time stamp.
OSPF	Displays the OSPF process ID: instance ID.
v:	Displays the OSPF version. Dell Networking OS supports version 2 only.
t:	Displays the type of packet sent: • 1 - Hello packet • 2 - database description • 3 - link state request • 4 - link state update • 5 - link state acknowledgement
l:	Displays the packet length.
rid:	Displays the OSPF router ID.
aid:	Displays the Autonomous System ID.
chk:	Displays the OSPF checksum.

Field	Description
aut:	States if OSPF authentication is configured. One of the following is listed: • 0 - no authentication configured • 1 - simple authentication configured using the `ip ospf authentication-key` command • 2 - MD5 authentication configured using the `ip ospf message-digest-key` command
auk:	If the `ip ospf authentication-key` command is configured, this field displays the key used.
keyid:	If the `ip ospf message-digest-key` command is configured, this field displays the MD5 key
to:	Displays the interface to which the packet is intended.
dst:	Displays the destination IP address.
netmask:	Displays the destination IP address mask.
pri:	Displays the OSPF priority
N, MC, E, T	Displays information available in the Options field of the HELLO packet: • N + (N-bit is set) • N - (N-bit is not set) • MC+ (bit used by MOSPF is set and router is able to forward IP multicast packets) • MC- (bit used by MOSPF is not set and router cannot forward IP multicast packets) • E + (router is able to accept AS External LSAs) • E - (router cannot accept AS External LSAs) • T + (router can support TOS) • T - (router cannot support TOS)
hi:	Displays the amount of time configured for the HELLO interval.
di:	Displays the amount of time configured for the DEAD interval.
dr:	Displays the IP address of the designated router.
bdr:	Displays the IP address of the Border Area Router.

Example

```
Dell#debug ip ospf 1 packet
OSPF process 90, packet debugging is on

Dell#
08:14:24 : OSPF(100:00):
Xmt. v:2 t:1(HELLO) l:44 rid:192.1.1.1
   aid:0.0.0.1 chk:0xa098 aut:0 auk: keyid:0 to:Gi 4/3 dst:
```

```
224.0.0.5
      netmask:255.255.255.0 pri:1 N-, MC-, E+, T-,
      hi:10 di:40 dr:90.1.1.1 bdr:0.0.0.0
```

default-information originate

To generate a default external route into an OSPF routing domain, configure Dell Networking Operating System (OS).

S6000

Syntax

```
default-information originate [always] [metric metric-value]
[metric-type type-value] [route-map map-name]
```

To return to the default values, use the `no default-information originate` command.

Parameters

always	(OPTIONAL) Enter the keyword `always` to specify that default route information must always be advertised.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number to configure a metric value for the route. The range is from 1 to 16777214.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then an OSPF link state type of 1 or 2 for default routes. The values are: • 1 = Type 1 external route • 2 = Type 2 external route
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of an established route map.

Defaults

Disabled.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

redistribute — redistributes routes from other routing protocols into OSPF.

default-metric

Change the metrics of redistributed routes to a value useful to OSPF. Use this command with the `redistribute` command.

S6000

Syntax

`default-metric *number*`

To return to the default values, use the `no default-metric [number]` command.

Parameters

number	Enter a number as the metric. The range is from 1 to 16777214.

Defaults

Disabled.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

redistribute — redistributes routes from other routing protocols into OSPF.

description

Add a description about the selected OSPF configuration.

S6000

Syntax

`description description`

To remove the OSPF description, use the `no description` command.

Parameters

description	Enter a text string description to identify the OSPF configuration (80 characters maximum).

Defaults

none

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

show ip ospf asbr — displays the VLAN configuration.

distance

Define an administrative distance for particular routes to a specific IP address.

S6000

Syntax

`distance weight [ip-address mask access-list-name]`

To delete the settings, use the `no distance weight [ip-address mask access-list-name]` command.

Parameters

weight	Specify an administrative distance. The range is from 1 to 255. The default is **110**.
ip-address	(OPTIONAL) Enter a router ID in the dotted decimal format. If you enter a router ID, include the mask for that router address.
mask	(OPTIONAL) Enter a mask in dotted decimal format or /n format.
access-list-name	(OPTIONAL) Enter the name of an IP standard access list, up to 140 characters.

Defaults **110**

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

distance ospf

Configure an OSPF distance metric for different types of routes.

S6000

Syntax

```
distance ospf [external dist3] [inter-area dist2] [intra-area dist1]
```

To delete these settings, use the `no distance ospf` command.

Parameters

external *dist3*	(OPTIONAL) Enter the keyword `external` then a number to specify a distance for external type 5 and 7 routes. The range is from 1 to 255. The default is **110**.

inter-area *dist2*	(OPTIONAL) Enter the keywords `inter-area` then a number to specify a distance metric for routes between areas. The range is from 1 to 255. The default is **110**.
intra-area *dist1*	(OPTIONAL) Enter the keywords `intra-area` then a number to specify a distance metric for all routes within an area. The range is from 1 to 255. The default is **110**.

Defaults

- external *dist3* = **110**
- inter-area *dist2* = **110**
- intra-area *dist1* = **110**

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

To specify a distance for routes learned from other routing domains, use the `redistribute` command.

distribute-list in

Apply a filter to incoming routing updates from OSPF to the routing table.

S6000

Syntax

`distribute-list` *`prefix-list-name`* `in [`*`interface`*`]`

To delete a filter, use the `no distribute-list` *`prefix-list-name`* `in [`*`interface`*`]` command.

Parameters

prefix-list-name	Enter the name of a configured prefix list.
interface	(OPTIONAL) Enter one of the following keywords and slot/port or number information: • For Port Channel groups, enter the keywords `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128. • For a SONET interface, enter the keyword `sonet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

distribute-list out

To restrict certain routes destined for the local routing table after the SPF calculation, apply a filter.

S6000

Syntax

```
distribute-list prefix-list-name out [bgp | connected | isis |
rip | static]
```

To remove a filter, use the `no distribute-list prefix-list-name out [bgp | connected | isis | rip | static]` command.

Parameters

prefix-list-name	Enter the name of a configured prefix list.
bgp	(OPTIONAL) Enter the keyword `bgp` to specify that BGP routes are distributed. **NOTE:** BGP and ISIS routes are not available on the C-Series. BGP, ISIS, and RIP routes are not available on the S-Series.
connected	(OPTIONAL) Enter the keyword `connected` to specify that connected routes are distributed.
isis	(OPTIONAL) Enter the keyword `isis` to specify that IS-IS routes are distributed. **NOTE:** BGP and ISIS routes are not available on the C-Series. BGP, ISIS, and RIP routes are not available on the S-Series.
rip	(OPTIONAL) Enter the keyword `rip` to specify that RIP routes are distributed. **NOTE:** BGP and ISIS routes are not available on the C-Series. BGP, ISIS, and RIP routes are not available on the S-Series.
static	(OPTIONAL) Enter the keyword `static` to specify that only manually configured routes are distributed.

Defaults

Not configured.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for the Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The `distribute-list out` command applies to routes autonomous system boundary routers (ASBRs) redistributes into OSPF. It can be applied to external type 2 and external type 1 routes, but not to intra-area and inter-area routes.

fast-convergence

This command sets the minimum LSA origination and arrival times to zero (0), allowing more rapid route computation so that convergence takes less time.

S6000

Syntax

`fast-convergence {number}`

To cancel fast-convergence, use the `no fast convergence` command.

Parameters

number	Enter the convergence level desired. The higher this parameter is set, the faster OSPF converge takes place. The range is from 1 to 4.

Defaults

none.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on all platforms.

Usage Information

The higher this parameter is set, the faster OSPF converge takes place.

NOTE: The faster the convergence, the more frequent the route calculations and updates. This behavior impacts CPU utilization and may impact adjacency stability in larger topologies.

Generally, convergence level 1 meets most convergence requirements. Higher convergence levels should only be selected following consultation with Dell Networking technical support.

flood-2328

Enable RFC-2328 flooding behavior.

S6000

Syntax	`flood-2328` To disable, use the `no flood-2328` command.
Defaults	Disabled.
Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

In OSPF, flooding is the most resource-consuming task. The flooding algorithm, described in RFC-2328, requires that OSPF flood LSAs (Link State Advertisements) on all interfaces, as governed by LSA’s flooding scope (see Section 13 of the RFC). When multiple direct links connect two routers, the RFC-2328 flooding algorithm generates significant redundant information across all links.

By default, Dell Networking OS implements an enhanced flooding procedure that dynamically and intelligently determines when to optimize flooding. Whenever possible, the OSPF task attempts to reduce flooding overhead by selectively flooding on a subset of the interfaces between two routers.

When you enable `flood-2328`, this command configures Dell Networking OS to flood LSAs on all interfaces.

graceful-restart grace-period

Specifies the time duration, in seconds, that the router's neighbors continue to advertise the router as fully adjacent regardless of the synchronization state during a graceful restart.

NOTE: This command enables OSPFv2 graceful restart globally by setting the grace period (in seconds) that an OSPFv2 router's neighbors continues to advertise the router as adjacent during a graceful restart.

S6000

Syntax

`graceful-restart grace-period seconds`

To disable the grace period, use the `no graceful-restart grace-period` command.

Parameters

seconds	Time duration, in seconds, that specifies the duration of the restart process before OSPF terminates the process. The range is from 40 to 1800 seconds.

Defaults Not Configured

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series. Added support for Multi-Process OSPF.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The Helper mode is enabled by default on the device. To enable the restart mode also on the device, you must configure the grace period using this command. After you enable restart mode the router advertises the neighbor as fully adjacent during a restart.

graceful-restart helper-reject

Specify the OSPF router to not act as a helper during graceful restart.

S6000

Syntax	`graceful-restart helper-reject` *`ip-address`* To return to default value, use the `no graceful-restart helper-reject` command.
Parameters	***ip-address*** — Enter the OSPF router-id, in IP address format, of the restart router that *will not* act as a helper during graceful restart.
Defaults	Not configured.
Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.8.1.0	`Restart role` enabled on the S-Series (Both `Helper` and `Restart` roles now supported on S-Series). Added support for Multi-Process OSPF.
Version 7.7.1.0	Added `Helper-Role` support on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

graceful-restart mode

Enable the graceful restart mode.

S6000

Syntax `graceful-restart mode [planned-only | unplanned-only]`

To disable graceful restart mode, use the `no graceful-restart mode` command.

Parameters

planned-only	(OPTIONAL) Enter the keywords `planned-only` to indicate graceful restart is supported in a planned restart condition only.
unplanned-only	(OPTIONAL) Enter the keywords `unplanned-only` to indicate graceful restart is supported in an unplanned restart condition only.

Defaults

Support for both planned and unplanned failures.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

graceful-restart role

Specify the role for your OSPF router during graceful restart.

S6000

Syntax

```
graceful-restart role [helper-only | restart-only]
```

To disable graceful restart role, use the `no graceful-restart role` command.

Parameters

role helper-only	(OPTIONAL) Enter the keywords `helper-only` to specify the OSPF router is a helper only during graceful restart.
role restart-only	(OPTIONAL) Enter the keywords `restart-only` to specify the OSPF router is a restart only during graceful-restart.

Defaults	By default, OSPF routers are both helper and restart routers during a graceful restart.
Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF. Added `Restart` and `Helper` roles support on the S-Series.
Version 7.7.1.0	Added `Helper-Role` support on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

ip ospf auth-change-wait-time

OSPF provides a grace period while OSPF changes its interface authentication type. During the grace period, OSPF sends out packets with new and old authentication scheme until the grace period expires.

S6000

Syntax

```
ip ospf auth-change-wait-time seconds
```

To return to the default, use the `no ip ospf auth-change-wait-time` command.

Parameters

seconds	Enter the seconds. The range is from 0 to 300.

Defaults	**zero (0) seconds**.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

ip ospf authentication-key

Enable authentication and set an authentication key on OSPF traffic on an interface.

S6000

Syntax

`ip ospf authentication-key [encryption-type] key`

To delete an authentication key, use the `no ip ospf authentication-key` command.

Parameters

encryption-type	(OPTIONAL) Enter 7 to encrypt the key.
key	Enter an eight-character string. Strings longer than eight characters are truncated.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information All neighboring routers in the same network must use the same password to exchange OSPF information.

ip ospf cost

Change the cost associated with the OSPF traffic on an interface.

S6000

Syntax `ip ospf cost cost`

To return to default value, use the `no ip ospf cost` command.

Parameters

cost	Enter a number as the cost. The range is from 1 to 65535.

Defaults The default cost is based on the reference bandwidth.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information If this command is not configured, cost is based on the `auto-cost` command.

When you configure OSPF over multiple vendors, to ensure that all routers use the same cost, use the `ip ospf cost` command. Otherwise, OSPF routes improperly.

Related Commands auto-cost — controls how the OSPF interface cost is calculated.

ip ospf dead-interval

Set the time interval since the last hello-packet was received from a router. After the interval elapses, the neighboring routers declare the router dead.

S6000

Syntax	`ip ospf dead-interval seconds` To return to the default values, use the `no ip ospf dead-interval` command.
Parameters	*seconds* — Enter the number of seconds for the interval. The range is from 1 to 65535. The default is **40 seconds**.
Defaults	**40 seconds**
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	By default, the dead interval is four times the default hello-interval.
Related Commands	ip ospf hello-interval — sets the time interval between the hello packets.

ip ospf hello-interval

Specify the time interval between the hello packets sent on the interface.

S6000

Syntax	`ip ospf hello-interval seconds` To return to the default value, use the `no ip ospf hello-interval` command.

Parameters

seconds	Enter the number of seconds for the interval. The range is from 1 to 65535. The default is **10 seconds**.

Defaults

10 seconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The time interval between the hello packets must be the same for routers in a network.

Related Commands

ip ospf dead-interval — sets the time interval before a router is declared dead.

ip ospf message-digest-key

Enable OSPF MD5 authentication and send an OSPF message digest key on the interface.

S6000

Syntax

```
ip ospf message-digest-key keyid md5 key
```

To delete a key, use the `no ip ospf message-digest-key keyid` command.

Parameters

keyid	Enter a number as the key ID. The range is from 1 to 255.
key	Enter a continuous character string as the password.

Defaults

No MD5 authentication is configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 9.1(0.0)	Included usage information on maximum number of digest keys per interface.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

You can configure a maximum of six digest keys on an interface. Of the available six digest keys, the switches select the MD5 key that is common. The remaining MD5 keys are unused.

To change to a different key on the interface, enable the new key while the old key is still enabled. Dell Networking OS sends two packets: the first packet authenticated with the old key and the second packet authenticated with the new key. This process ensures that the neighbors learn the new key and communication is not disrupted by keeping the old key enabled.

After the reply is received and the new key is authenticated, delete the old key. Dell recommends keeping only one key per interface.

NOTE: The MD5 secret is stored as plain text in the configuration file with service password encryption. Write down or otherwise record the key. You cannot learn the key once it is configured. Use caution when changing the key.

ip ospf mtu-ignore

Disable OSPF MTU mismatch detection upon receipt of database description (DBD) packets.

S6000

Syntax

`ip ospf mtu-ignore`

To return to the default, use the `no ip ospf mtu-ignore` command.

Defaults

Enabled.

Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

ip ospf network

Set the network type for the interface.

S6000

Syntax

```
ip ospf network {broadcast | point-to-point}
```

To return to the default, use the `no ip ospf network` command.

Parameters

broadcast	Enter the keyword `broadcast` to designate the interface as part of a broadcast network.
point-to-point	Enter the keywords `point-to-point` to designate the interface as part of a point-to-point network.

Defaults	Broadcast.
Command Modes	ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

ip ospf priority

To determine the designated router for the OSPF network, set the priority of the interface.

S6000

Syntax

`ip ospf priority number`

To return to the default setting, use the `no ip ospf priority` command.

Parameters

number	Enter a number as the priority. The range is from 0 to 255. The default is **1**.

Defaults

1

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

Setting a priority of 0 makes the router ineligible for election as a designated router or backup designated router.

Use this command for interfaces connected to multi-access networks, not point-to-point networks.

ip ospf retransmit-interval

Set the retransmission time between lost link state advertisements (LSAs) for adjacencies belonging to the interface.

S6000

Syntax	`ip ospf retransmit-interval seconds` To return to the default values, use the `no ip ospf retransmit-interval` command.
Parameters	

seconds	Enter the number of seconds as the interval between retransmission. The range is from 1 to 3600. The default is **5 seconds**. This interval must be greater than the expected round-trip time for a packet to travel between two routers.

Defaults	**5 seconds**
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	Set the time interval to a number large enough to prevent unnecessary retransmissions. For example, the interval must be larger for interfaces connected to virtual links.

ip ospf transmit-delay

To send a link state update packet on the interface, set the estimated time elapsed.

S6000

Syntax

```
ip ospf transmit-delay seconds
```

To return to the default value, use the `no ip ospf transmit-delay` command.

Parameters

seconds	Enter the number of seconds as the interval between retransmission. The range is from 1 to 3600. The default is **1 second**. This value must be greater than the transmission and propagation delays for the interface.

Defaults **1 second**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

log-adjacency-changes

To send a Syslog message about changes in the OSPF adjacency state, set Dell Networking OS.

S6000

Syntax

```
log-adjacency-changes
```

To disable the Syslog messages, use the `no log-adjacency-changes` command.

Defaults

Disabled.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

maximum-paths

Enable the software to forward packets over multiple paths.

S6000

Syntax

`maximum-paths number`

To disable packet forwarding over multiple paths, use the `no maximum-paths` command.

Parameters

number	Specify the number of paths. The range for OSPFv2 is from 1 to 64. The default for OSPFv2 is **4 paths**. The range for OSPFv3 is from 1 to 64. The default for OSPFv3 is **8 paths**.

Defaults

4

Command Modes

ROUTER OSPF for OSPFv2

ROUTER OSPFv3 for OSPFv3

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.1(0.0)	Introduced support for OSPFv3 on the S4810 and Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

mib-binding

Enable this OSPF process ID to manage the SNMP traps and process SNMP queries.

S6000

Syntax

`mib-binding`

To mib-binding on this OSPF process, use the `no mib-binding` command.

Defaults

none.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced to all platforms.

Usage Information

This command is either enabled or disabled. If no OSPF process is identified as the MIB manager, the first OSPF process is used.

If an OSPF process has been selected, it must be disabled prior to assigning new process ID the MIB responsibility.

network area

Define which interfaces run OSPF and the OSPF area for those interfaces.

S6000

Syntax	`network ip-address mask area area-id` To disable an OSPF area, use the `no network ip-address mask area area-id` command.

Parameters

ip-address	Specify a primary or secondary address in dotted decimal format. The primary address is required before adding the secondary address.
mask	Enter a network mask in /prefix format. (/x)
area-id	Enter the OSPF area ID as either a decimal value or in a valid IP address. Decimal value range is from 0 to 65535. IP address format is dotted decimal format A.B.C.D. **NOTE:** If the area ID is smaller than 65535, it is converted to a decimal value. For example, if you use an area ID of 0.0.0.1, it is converted to 1.

Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced to all platforms.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	To enable OSPF on an interface, the `network area` command must include, in its range of addresses, the primary IP address of an interface.

NOTE: An interface can be attached only to a single OSPF area.

If you delete all the network area commands for Area 0, the `show ip ospf` command output does not list Area 0.

passive-interface

Suppress both receiving and sending routing updates on an interface.

S6000

Syntax	`passive-interface {default	*interface*}` To enable both the receiving and sending routing, use the `no passive-interface interface` command. To return all OSPF interfaces (current and future) to active, use the `no passive-interface default` command.

Parameters

default	Enter the keyword `default` to make all OSPF interfaces (current and future) passive.
interface	Enter the following keywords and slot/port or number information: • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For Port Channel groups, enter the keywords `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Modified to include the keyword `default`.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

Although the passive interface does not send or receive routing updates, the network on that interface is still included in OSPF updates sent using other interfaces.

The `default` keyword sets all interfaces as passive. You can then configure individual interfaces, where adjacencies are desired, using the `no passive-interface` *`interface`* command. The `no` form of this command is inserted into the configuration for individual interfaces when the `no passive-interface` *`interface`* command is issued while `passive-interface default` is configured.

This command behavior has changed as follows:

`passive-interface` *`interface`*

- The previous `no passive-interface` *`interface`* is removed from the running configuration.
- The ABR status for the router is updated.
- Save `passive-interface` *`interface`* into the running configuration.

`passive-interface default`

- All present and future OSPF interfaces are marked as *passive*.
- Any adjacency is explicitly terminated from all OSPF interfaces.
- All previous `passive-interface` *`interface`* commands are removed from the running configuration.
- All previous `no passive-interface` *`interface`* commands are removed from the running configuration.

`no passive-interface` *`interface`*

- Remove the interface from the passive list.
- The ABR status for the router is updated.
- If `passive-interface default` is specified, then save `no passive-interface` *`interface`* into the running configuration.

`No passive-interface default`

- Clear everything and revert to the default behavior.
- All previously marked passive interfaces are removed.

- May update ABR status.

On configuring suppression using the passive-interface command, the state of the OSPF neighbor does not change to INIT; instead, the state of the OSPF neighbor changes to DOWN after the dead-timer expires.

redistribute

Redistribute information from another routing protocol throughout the OSPF process.

S6000

Syntax

`redistribute {connected | isis | ospf | rip | static} [metric` *`metric-value`* `| metric-type` *`type-value`*`] [route-map` *`map-name`*`] [tag` *`tag-value`*`]`

To disable redistribution, use the `no redistribute {connected | isis | rip | static}` command.

Parameters

connected	Enter the keyword `connected` to specify that information from active routes on interfaces is redistributed.
isis	Enter the keyword isis to specify that ISO IS-IS information is redistributed.
ospf	Enter the keyword ospf to specify that information corresponding to OSPF is redistributes.
rip	Enter the keyword `rip` to specify that RIP routing information is redistributed.
static	Enter the keyword `static` to specify that information from static routes is redistributed.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number. The range is from 0 (zero) to 16777214.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then one of the following: • 1 = OSPF External type 1 • 2 = OSPF External type 2
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of the route map.
tag *tag-value*	(OPTIONAL) Enter the keyword `tag` then a number. The range is from 0 to 4294967295.

Defaults

Not configured.

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

To redistribute the default route (0.0.0.0/0), configure the `default-information originate` command.

Despite removing an OSPF process globally, the OSPF process is not completely removed from the BGP configuration.

Related Commands

default-information originate — generates a default route into the OSPF routing domain.

redistribute bgp

Redistribute BGP routing information throughout the OSPF instance.

S6000

Syntax

`redistribute bgp as number [metric metric-value] | [metric-type type-value] | [tag tag-value]`

To disable redistribution, use the `no redistribute bgp as number [metric metric-value] | [metric-type type-value] [route-map map-name] [tag tag-value]` command.

Parameters

as number	Enter the autonomous system number. The range is from 1 to 65535.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then the metric-value number. The range is from 0 to16777214.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then one of the following: • 1 = for OSPF External type 1

- 2 = for OSPF External type 2

route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of the route map.
tag *tag-value*	(OPTIONAL) Enter the keyword `tag` to set the tag for routes redistributed into OSPF. The range is from 0 to 4294967295.

Defaults
none

Command Modes
ROUTER OSPF

Command History
This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.3	Added Route Map for BGP Redistribution to OSPF.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added the keyword `default`.
pre-Version 6.1.1.1	Introduced on the E-Series.

redistribute isis

Redistribute IS-IS routing information throughout the OSPF instance.

S6000

Syntax

```
redistribute isis [tag] [level-1 | level-1-2 | level-2] [metric
metric-value | metric-type type-value] [route-map map-name]
[tag tag-value]
```

To disable redistribution, use the `no redistribute isis [tag] [level-1 | level-1-2 | level-2] [metric metric-value | metric-type type-value] [route-map map-name] [tag tag-value]` command.

Parameters

tag	(OPTIONAL) Enter the name of the IS-IS routing process.

level-1	(OPTIONAL) Enter the keywords `level-1` to redistribute only IS-IS Level-1 routes.
level-1-2	(OPTIONAL) Enter the keywords `level-1-2` to redistribute both IS-IS Level-1 and Level-2 routes.
level-2	(OPTIONAL) Enter the keywords `level-2` to redistribute only IS-IS Level-2 routes.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number. The range is from 0 (zero) to 4294967295.
metric-type *type-value*	(OPTIONAL) Enter the keywords `metric-type` then one of the following: • 1 = for OSPF External type 1 • 2 = for OSPF External type 2
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of the route map.
tag *tag-value*	(OPTIONAL) Enter the keyword `tag` to set the tag for routes redistributed into OSPF. The range is from 0 to 4294967295.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

router-id

To configure a fixed router ID, use this command.

S6000

Syntax	`router-id ip-address` To remove the fixed router ID, use the `no router-id ip-address` command.

Parameters

ip-address	Enter the router ID in the IP address format.

Defaults none.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

You can configure an arbitrary value in the IP address format for each router. However, each router ID must be unique. If you use this command on an OSPF router process, which is already active (that is, has neighbors), a prompt reminding you that changing the router-id brings down the existing OSPF adjacency. The new router ID is effective at the next reload.

Example

```
Dell(conf)#router ospf 100
Dell(conf-router_ospf)#router-id 1.1.1.1
Changing router-id will bring down existing OSPF adjacency [y/
n]:

Dell(conf-router_ospf)#show config
!
router ospf 100
router-id 1.1.1.1
Dell(conf-router_ospf)#no router-id
Changing router-id will bring down existing OSPF adjacency [y/
n]:
Dell#
```

router ospf

To configure an OSPF instance, enter ROUTER OSPF mode.

S6000

Syntax	`router ospf process-id [vrf {vrf name}]` To clear an OSPF instance, use the `no router ospf process-id` command.

Parameters

process-id	Enter a number for the OSPF instance. The range is from 1 to 65535.
vrf name	(Optional) Enter the VRF process identifier to tie the OSPF instance to the VRF. All network commands under this OSPF instance are then tied to the VRF instance.

Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.1(0.0)	Added support for OSPFv3 on the S4810 and Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.9.1.0	Added support for VRF.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	You must have an IP address assigned to an interface to enter ROUTER OSPF mode and configure OSPF. After the OSPF process and the VRF are tied together, you cannot use the OSPF Process ID again in the system.

Example	`Dell(conf)#router ospf 2` `Dell(conf-router_ospf)#`

show config

Display the non-default values in the current OSPF configuration.

S6000

Syntax	`show config`
Command Modes	ROUTER OSPF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Example

```
Dell(conf-router_ospf)#show config
!
router ospf 3
passive-interface FastEthernet 0/1
Dell(conf-router_ospf)#
```

show ip ospf

Display information on the OSPF process configured on the switch.

S6000

Syntax `show ip ospf [`*`process-id`*` | vrf `*`vrf name`*`]`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf name*	Show only the OSPF information tied to the VRF process.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Added output for LSA throttling timers.
Version 8.3.7.0	Introduced on the S4810.
Version 7.9.1.0	Added support for VRF.
Version 7.8.1.0	Added support of Multi-Process OSPF.
Version 7.8.1.0	Added the *`process-id`* option, in support of Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

If you delete all the network area commands for Area 0, the `show ip ospf` command output does not list Area 0.

The following describes the `show ip ospf` command shown in the following example.

Line Beginning with	Description
"Routing Process..."	Displays the OSPF process ID and the IP address associated with the process ID.
"Supports only..."	Displays the number of Type of Service (TOS) rouse supported.
"SPF schedule..."	Displays the delay and hold time configured for this process ID.
"Convergence Level"	

Line Beginning with	Description
"Min LSA…."	Displays the intervals set for LSA transmission and acceptance.
"Number of…"	Displays the number and type of areas configured for this process ID.

Example

```
Dell#show ip ospf 10
Routing Process ospf 10 with ID 1.1.1.1 Virtual router default-
vrf
Supports only single TOS (TOS0) routes
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Convergence Level 0
Min LSA origination 0 msec, Min LSA arrival 1000 msec
Min LSA hold time 5000 msec, Max LSA wait time 5000 msec
Number of area in this router is 1, normal 1 stub 0 nssa 0
    Area BACKBONE (0)
      Number of interface in this area is 1
      SPF algorithm executed 205 times
      Area ranges are
Dell#
```

Related Commands

show ip ospf database — displays information about the OSPF routes configured.

show ip ospf interface — displays the OSPF interfaces configured.

show ip ospf neighbor — displays the OSPF neighbors configured.

show ip ospf asbr

Display all autonomous system boundary router (ASBR) routers visible to OSPF.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] asbr
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to show all ASBR routers visible to the OSPF process that is tied to a specific VRF.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support of Multi-Process OSPF.
Version 7.8.1.0	Added the *`process-id`* option, in support of Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

To isolate problems with external routes, use this command. In OSPF, external routes are calculated by adding the LSA cost to the cost of reaching the ASBR router. If an external route does not have the correct cost, use this command to determine if the path to the originating router is correct. The display output is not sorted in any order.

NOTE: ASBRs that are not in directly connected areas are also displayed.

You can determine if an ASBR is in a directly connected area (or not) by the flags. For ASBRs in a directly connected area, E flags are set. In the following example, router 1.1.1.1 is in a directly connected area since the Flag is E/-/-/. For remote ASBRs, the E flag is clear (-/-/-/).

Example

```
Dell#show ip ospf 1asbr

RouterID  Flags   Cost Nexthop   Interface Area
3.3.3.3   -/-/-/  2   10.0.0.2   Gi 0/1    1
1.1.1.1   E/-/-/  0   0.0.0.0    -         0
Dell#
```

show ip ospf database

Display all LSA information. If you do not enable OSPF on the switch, no output is generated.

S6000

Syntax

```
show ip ospf process-id [vrf vrf-name] database [database-
summary]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to view LSA information on OSPF processes corresponding to that VRF.
database-summary	(OPTIONAL) Enter the keywords `database-summary` to the display the number of LSA types in each area and the total number of LSAs.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support of Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `database` command shown in the following example.

Field	Description
Link ID	Identifies the router ID.
ADV Router	Identifies the advertising router’s ID.
Age	Displays the link state age.
Seq#	Identifies the link state sequence number. This number allows you to identify old or duplicate link state advertisements.

Field	Description
Checksum	Displays the Fletcher checksum of an LSA’s complete contents.
Link count	Displays the number of interfaces for that router.

Example

```
Dell>show ip ospf 1 database

     OSPF Router with ID (11.1.2.1) (Process ID 1)
                Router (Area 0.0.0.0)
Link ID      ADV Router   Age  Seq#       Checksum Link count
11.1.2.1     11.1.2.1     673  0x80000005 0x707e   2
13.1.1.1     13.1.1.1     676  0x80000097 0x1035   2
192.68.135.2 192.68.135.2 1419 0x80000294 0x9cbd   1

               Network (Area 0.0.0.0)
Link ID      ADV Router   Age  Seq#       Checksum
10.2.3.2     13.1.1.1     676  0x80000003 0x6592
10.2.4.2     192.68.135.2 908  0x80000055 0x683e

               Type-5 AS External
Link ID      ADV Router   Age  Seq#       Checksum Tag
0.0.0.0      192.68.135.2 908  0x80000052 0xeb83   100
1.1.1.1      192.68.135.2 908  0x8000002a 0xbd27   0
10.1.1.0     11.1.2.1     718  0x80000002 0x9012   0
10.1.2.0     11.1.2.1     718  0x80000002 0x851c   0
10.2.2.0     11.1.2.1     718  0x80000002 0x7927   0
10.2.3.0     11.1.2.1     718  0x80000002 0x6e31   0
10.2.4.0     13.1.1.1     1184 0x80000068 0x45db   0
11.1.1.0     11.1.2.1     718  0x80000002 0x831e   0
11.1.2.0     11.1.2.1     718  0x80000002 0x7828   0
12.1.2.0     192.68.135.2 1663 0x80000054 0xd8d6   0
13.1.1.0     13.1.1.1     1192 0x8000006b 0x2718   0
13.1.2.0     13.1.1.1     1184 0x8000006b 0x1c22   0
172.16.1.0   13.1.1.1     148  0x8000006d 0x533b   0
Dell>
```

Related Commands

show ip ospf database asbr-summary — displays only ASBR summary LSA information.

show ip ospf database asbr-summary

Display information about autonomous system (AS) boundary LSAs.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] database asbr-summary
[link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view display information about AS boundary LSAs corresponding to a specific VRF.

link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf database asbr-summary` command shown in the following example.

Field	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item:

Field	Description
	 - TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. - DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. - E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA's type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the advertising router's ID.
Checksum	Displays the Fletcher checksum of the LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Network Mask	Displays the network mask implemented on the area.
TOS	Displays the Type of Service (TOS) options. Option 0 is the only option.
Metric	Displays the LSA metric.

Example

```
Dell#show ip ospf 100 database asbr-summary

     OSPF Router with ID (1.1.1.10) (Process ID 100)

       Summary Asbr (Area 0.0.0.0)

LS age: 1437
Options: (No TOS-capability, No DC, E)
LS type: Summary Asbr
Link State ID: 103.1.50.1
Advertising Router: 1.1.1.10
LS Seq Number: 0x8000000f
Checksum: 0x8221
Length: 28
Network Mask: /0
      TOS: 0 Metric: 2

LS age: 473
Options: (No TOS-capability, No DC, E)
LS type: Summary Asbr
Link State ID: 104.1.50.1
Advertising Router: 1.1.1.10
LS Seq Number: 0x80000010
Checksum: 0x4198
Length: 28
--More--
```

Related Commands

show ip ospf database — displays OSPF database information.

show ip ospf database external

Display information on the AS external (type 5) LSAs.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] database external
[link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view information on AS external LSAs corresponding to the OSPF processes that are tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `database external` command shown in the following example.

Field	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: • TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. • DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. • E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA's type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
LS Seq Number	Identifies the link state sequence number. This number enables you to identify old or duplicate LSAs.
Checksum	Displays the Fletcher checksum of the LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Network Mask	Displays the network mask implemented on the area.
Metrics Type	Displays the external type.
TOS	Displays the Type of Service (TOS) options. Option 0 is the only option.
Metric	Displays the LSA metric.
Forward Address	Identifies the address of the forwarding router. Data traffic is forwarded to this router. If the forwarding address is 0.0.0.0, data traffic is forwarded to the originating router.
External Route Tag	Displays the 32-bit field attached to each external route. The OSPF protocol does not use this field, but you can use the field for external route management.

Example

```
Dell#show ip ospf 1 database external
```

```
    OSPF Router with ID (20.20.20.5) (Process ID 1)

         Type-5 AS External

LS age: 612
Options: (No TOS-capability, No DC, E)
LS type: Type-5 AS External
Link State ID: 12.12.12.2
Advertising Router: 20.31.3.1
LS Seq Number: 0x80000007
Checksum: 0x4cde
Length: 36
Network Mask: /32
     Metrics Type: 2
     TOS: 0
     Metrics: 25
     Forward Address: 0.0.0.0
     External Route Tag: 43

LS age: 1868
Options: (No TOS-capability, DC)
LS type: Type-5 AS External
Link State ID: 24.216.12.0
Advertising Router: 20.20.20.8
LS Seq Number: 0x80000005
Checksum: 0xa00e
Length: 36
Network Mask: /24
     Metrics Type: 2
     TOS: 0
     Metrics: 1
     Forward Address: 0.0.0.0
     External Route Tag: 701
Dell#
```

Related Commands

show ip ospf database — displays OSPF database information.

show ip ospf database network

Display the network (type 2) LSA information.

S6000

Syntax

`show ip ospf [process-id | vrf vrf-name] database network [link-state-id] [adv-router ip-address]`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view the network LSA information corresponding to an OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following:

- the network's IP address for Type 3 LSAs or Type 5 LSAs
- the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs
- the default destination (0.0.0.0) for Type 5 LSAs

adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `database network` command shown in the following example.

Field	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: • TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. • DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits.

Field	Description
	- E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA's type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
Checksum	Identifies the link state sequence number. This number enables you to identify old or duplicate LSAs.
Length	Displays the Fletcher checksum of an LSA's complete contents.
Network Mask	Displays the length in bytes of the LSA.
Attached Router	Identifies the IP address of routers attached to the network.

Example

```
Dell#show ip ospf 1 data network

    OSPF Router with ID (20.20.20.5) (Process ID 1)

        Network (Area 0.0.0.0)
 LS age: 1372
Options: (No TOS-capability, DC, E)
LS type: Network
Link State ID: 202.10.10.2
Advertising Router: 20.20.20.8
LS Seq Number: 0x80000006
Checksum: 0xa35
Length: 36
Network Mask: /24
     Attached Router: 20.20.20.8
     Attached Router: 20.20.20.9
     Attached Router: 20.20.20.7

         Network (Area 0.0.0.1)

LS age: 252
Options: (TOS-capability, No DC, E)
LS type: Network
Link State ID: 192.10.10.2
Advertising Router: 192.10.10.2
LS Seq Number: 0x80000007
Checksum: 0x4309
Length: 36
Network Mask: /24
     Attached Router: 192.10.10.2
     Attached Router: 20.20.20.1
     Attached Router: 20.20.20.5
Dell#
```

Related Commands

show ip ospf database — displays OSPF database information.

show ip ospf database nssa-external

Display NSSA-External (type 7) LSA information.

S6000

Syntax	`show ip ospf [process-id | vrf vrf-name] database nssa-external [link-state-id] [adv-router ip-address]`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followeed by the name of the VRF to view NSSA-External LSA information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

show ip ospf database — displays OSPF database information.

show ip ospf database opaque-area

Display the opaque-area (type 10) LSA information.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] database opaque-area
[link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view opaque-area LSA information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `database opaque-area` command shown in the following example.

Item	Description
LS Age	Displays the LSA's age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: • TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. • DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. • E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA's type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the advertising router's ID.
Checksum	Displays the Fletcher checksum of the LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Opaque Type	Displays the Opaque type field (the first 8 bits of the Link State ID).
Opaque ID	Displays the Opaque type-specific ID (the remaining 24 bits of the Link State ID).

Example

```
Dell>show ip ospf 1 database opaque-area

    OSPF Router with ID (3.3.3.3) (Process ID 1)
         Type-10 Opaque Link Area (Area 0)

LS age: 1133
```

```
Options: (No TOS-capability, No DC, E)
LS type: Type-10 Opaque Link Area
Link State ID: 1.0.0.1
Advertising Router: 10.16.1.160
LS Seq Number: 0x80000416
Checksum: 0x376
Length: 28
Opaque Type: 1
Opaque ID: 1
Unable to display opaque data

LS age: 833
Options: (No TOS-capability, No DC, E)
LS type: Type-10 Opaque Link Area
Link State ID: 1.0.0.2
Advertising Router: 10.16.1.160
LS Seq Number: 0x80000002
Checksum: 0x19c2
--More--
```

Related Commands	show ip ospf database — displays OSPF database information.

show ip ospf database opaque-as

Display the opaque-as (type 11) LSA information.

S6000

Syntax

`show ip ospf process-id database opaque-as [link-state-id] [adv-router ip-address]`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` and the ip-address to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

show ip ospf database — displays OSPF database information.

show ip ospf database opaque-link

Display the opaque-link (type 9) LSA information.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] database opaque-link
[link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view opaque-link LSA information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` then the IP address of an Advertising Router to display only the LSA information about that router.

Command Modes	- EXEC - EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

show ip ospf database — displays OSPF database information.

show ip ospf database router

Display the router (type 1) LSA information.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] database router [link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view the router LSA information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: - the network's IP address for Type 3 LSAs or Type 5 LSAs

- the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs
- the default destination (0.0.0.0) for Type 5 LSAs

adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` followed by the IP address of an Advertising Router to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added supported for VRF.
Version 9.0.20	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `database router` command shown in the following example.

Item	Description
LS Age	Displays the LSA age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: • TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. • DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits.

Item	Description
	• E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
LS Seq Number	Displays the link state sequence number. This number detects duplicate or old LSAs.
Checksum	Displays the Fletcher checksum of an LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Number of Links	Displays the number of active links to the type of router (Area Border Router or AS Boundary Router) listed in the previous line.
Link connected to:	Identifies the type of network to which the router is connected.
(Link ID)	Identifies the link type and address.
(Link Data)	Identifies the router interface address.
Number of TOS Metric	Lists the number of TOS metrics.
TOS 0 Metric	Lists the number of TOS 0 metrics.

Example

```
Dell#show ip ospf 100 database router

     OSPF Router with ID (1.1.1.10) (Process ID 100)

         Router (Area 0)

LS age: 967
Options: (No TOS-capability, No DC, E)
LS type: Router
Link State ID: 1.1.1.10
Advertising Router: 1.1.1.10
LS Seq Number: 0x8000012f
Checksum: 0x3357
Length: 144
AS Boundary Router
Area Border Router
  Number of Links: 10

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.129.1
    (Link Data) Router Interface address: 192.68.129.1
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.130.1
    (Link Data) Router Interface address: 192.68.130.1
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.142.2
    (Link Data) Router Interface address: 192.68.142.2
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.141.2
    (Link Data) Router Interface address: 192.68.141.2
    Number of TOS metric: 0
       TOS 0 Metric: 1

  Link connected to: a Transit Network
    (Link ID) Designated Router address: 192.68.140.2
    (Link Data) Router Interface address: 192.68.140.2
    Number of TOS metric: 0
       TOS 0 Metric: 1

Link connected to: a Stub Network
    (Link ID) Network/subnet number: 11.1.5.0
--More--
```

Related Commands

[show ip ospf database](#) — displays OSPF database information.

show ip ospf database summary

Display the network summary (type 3) LSA routing information.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] database summary
[link-state-id] [adv-router ip-address]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view LSA routing information corresponding to the OSPF process that is tied to a specific VRF.
link-state-id	(OPTIONAL) Specify LSA ID in dotted decimal format. The LSA ID value depends on the LSA type, and it can be one of the following: • the network's IP address for Type 3 LSAs or Type 5 LSAs • the router's OSPF router ID for Type 1 LSAs or Type 4 LSAs • the default destination (0.0.0.0) for Type 5 LSAs
adv-router *ip-address*	(OPTIONAL) Enter the keywords `adv-router` then the IP address of an Advertising Router to display only the LSA information about that router.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf process-id database summary` command shown in the following example.

Item	Description
LS Age	Displays the LSA age.
Options	Displays the optional capabilities available on router. The following options can be found in this item: • TOS-capability or No TOS-capability is displayed depending on whether the router can support Type of Service. • DC or No DC is displayed depending on whether the originating router can support OSPF over demand circuits. • E or No E is displayed on whether the originating router can accept AS External LSAs.
LS Type	Displays the LSA type.
Link State ID	Displays the Link State ID.
Advertising Router	Identifies the router ID of the LSA's originating router.
LS Seq Number	Displays the link state sequence number. This number allows you to identify old or duplicate LSAs.

Item	Description
Checksum	Displays the Fletcher checksum of an LSA's complete contents.
Length	Displays the length in bytes of the LSA.
Network Mask	Displays the network mask implemented on the area.
TOS	Displays the TOS options. Option 0 is the only option.
Metric	Displays the LSA metrics.

Example

```
Dell#show ip ospf 100 database summary

    OSPF Router with ID (1.1.1.10) (Process ID 100)

        Summary Network (Area 0.0.0.0)

LS age: 1551
Options: (No TOS-capability, DC, E)
LS type: Summary Network
Link State ID: 192.68.16.0
Advertising Router: 192.168.17.1
LS Seq Number: 0x80000054
Checksum: 0xb5a2
Length: 28
Network Mask: /24
    TOS: 0 Metric: 1

LS age: 9
Options: (No TOS-capability, No DC, E)
LS type: Summary Network
Link State ID: 192.68.32.0
Advertising Router: 1.1.1.10
LS Seq Number: 0x80000016
Checksum: 0x987c
Length: 28
Network Mask: /24
   TOS: 0 Metric: 1

LS age: 7
Options: (No TOS-capability, No DC, E)
LS type: Summary Network
Link State ID: 192.68.33.0
Advertising Router: 1.1.1.10
LS Seq Number: 0x80000016
Checksum: 0x1241
Length: 28
Network Mask: /26
   TOS: 0 Metric: 1

Dell#
```

Related Commands

show ip ospf database — displays OSPF database information.

show ip ospf interface

Display the OSPF interfaces configured. If OSPF is not enabled on the switch, no output is generated.

S6000

Syntax	`show ip ospf [process-id	vrf vrf-name] interface [interface]`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to show the OSPF processes that are tied to a specific VRF.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For the null interface, enter the keyword `null` then zero (0). • For loopback interfaces, enter the keyword `loopback` then a number from 0 to 16383. • For tunnel interfaces, enter the keyword `tunnel` then a number from 0 to 16383. • For Port Channel groups, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then the VLAN ID. The range is from 1 to 4094. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `interface` command shown in the following example.

Item	Description
GigabitEthernet...	This line identifies the interface type slot/port and the status of the OSPF protocol on that interface.
Internet Address...	This line displays the IP address, network mask and area assigned to this interface.
Process ID...	This line displays the OSPF Process ID, Router ID, Network type and cost metric for this interface.
Transmit Delay...	This line displays the interface's settings for Transmit Delay, State, and Priority. In the State setting, BDR is Backup Designated Router.
Designated Router...	This line displays the ID of the Designated Router and its interface address.
Backup Designated...	This line displays the ID of the Backup Designated Router and its interface address.
Timer intervals...	This line displays the interface's timer settings for Hello interval, Dead interval, Transmit Delay (Wait), and Retransmit Interval.
Hello due...	This line displays the amount time until the next Hello packet is sent out this interface.
Neighbor Count...	This line displays the number of neighbors and adjacent neighbors. Listed below this line are the details about each adjacent neighbor.

Example

```
Dell>show ip ospf int

GigabitEthernet 13/17 is up, line protocol is up
  Internet Address 192.168.1.2/30, Area 0.0.0.1
  Process ID 1, Router ID 192.168.253.2, Network Type
BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 192.168.253.2, Interface address
192.168.1.2
  Backup Designated Router (ID) 192.168.253.1, Interface
address 192.168.1.1
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
    Hello due in 00:00:02
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 192.168.253.1 (Backup Designated
Router)

GigabitEthernet 13/23 is up, line protocol is up
  Internet Address 192.168.0.1/24, Area 0.0.0.1
  Process ID 1, Router ID 192.168.253.2, Network Type
BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DROTHER, Priority 1
  Designated Router (ID) 192.168.253.5, Interface address
192.168.0.4
  Backup Designated Router (ID) 192.168.253.3, Interface
address 192.168.0.2
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
    Hello due in 00:00:08
  Neighbor Count is 3, Adjacent neighbor count is 2
    Adjacent with neighbor 192.168.253.5 (Designated Router)
    Adjacent with neighbor 192.168.253.3 (Backup Designated
Router)

Loopback 0 is up, line protocol is up
  Internet Address 192.168.253.2/32, Area 0.0.0.1
  Process ID 1, Router ID 192.168.253.2, Network Type
LOOPBACK, Cost: 1
Loopback interface is treated as a stub Host.
Dell>
```

show ip ospf neighbor

Display the OSPF neighbors connected to the local router.

S6000

Syntax `show ip ospf [process-id | vrf vrf-name] neighbor`

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to show information corresponding to the OSPF neighbors that are tied to a specific VRF.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000..

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf` *`process-id`* `neighbor` command shown in the following example.

Item	Description
Neighbor ID	Displays the neighbor router ID.
Pri	Displays the priority assigned neighbor.
State	Displays the OSPF state of the neighbor.
Dead Time	Displays the expected time until FTOS declares the neighbor dead.
Address	Displays the IP address of the neighbor.
Interface	Displays the interface type slot/port information.
Area	Displays the neighbor's area (process ID).

Example

```
Dell#show ip ospf 34 neighbor

Neighbor ID Pri State       Dead Time Address   Interface Area
20.20.20.7  1 FULL/DR     00:00:32 182.10.10.3 Gi 0/0 0.0.0.2
192.10.10.2 1 FULL/DR     00:00:37 192.10.10.2 Gi 0/1 0.0.0.1
20.20.20.1  1 FULL/DROTHER00:00:36 192.10.10.4 Gi 0/1 0.0.0.1
Dell#
```

show ip ospf routes

Display routes OSPF calculates and stores in OSPF RIB.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] routes
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to show the OSPF RIB information corresponding to the OSPF processes that are tied to a specific VRF.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

This command is useful in isolating routing problems between the OSPF and the RTM. For example, if a route is missing from the RTM/FIB but is visible from the display output of this command, the problem is with downloading the route to the RTM.

This command has the following limitations:

- The display output is sorted by prefixes; intra-area ECMP routes are not displayed together.
- For Type 2 external routes, Type 1 cost is not displayed.

NOTE: Starting with Version 9.4(0.0), the loopback IP address advertised to the neighbor is not displayed in the output because they are not accounted as inactive OSPF routes, whereas the loopback IP address is displayed until Dell Networking OS Version 9.3(0.0). Starting with Version 9.4(0.0), the show ip ospf routes command displays the interface and area ID information of connected networks in addition to the other settings, whereas these details are not displayed until Dell Networking OS Version 9.3(0.0). Starting with Version 9.4(0.0), the metric of E2 routes in the output is displayed as an external metric, whereas until Dell Networking OS Version 9.3(0.0), the number of hops to the ASBR for E2 routes are displayed in the output.

Example

```
Dell#show ip ospf 100 route

Prefix         Cost Nexthop   Interface Area  Type
1.1.1.1         1   0.0.0.0   Lo 0      0     Intra-Area
3.3.3.3         2   13.0.0.3  Gi 0/47   1     Intra-Area
```

```
13.0.0.0        1   0.0.0.0   Gi 0/47   0      Intra-Area
150.150.150.0  2   13.0.0.3  Gi 0/47   -      External
172.30.1.0      2   13.0.0.3  Gi 0/47   1      Intra-Area
Dell#
```

show ip ospf statistics

Display OSPF statistics.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] statistics global |
[interface name {neighbor router-id}]
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to display statistics corresponding to the OSPF process that is tied to a specific VRF.
global	Enter the keyword `global` to display the packet counts received on all running OSPF interfaces and packet counts OSPF neighbors receive and transmit.
interface *name*	(OPTIONAL) Enter the keyword `interface` then one of the following interface keywords and slot/port or number information: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For Port Channel groups, enter the keywords `port-channel` then a number. For the C-Series and S-Series, the range is from 1 to 128. • For a SONET interface, enter the keyword `sonet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
neighbor *router-id*	(OPTIONAL) Enter the keyword `neighbor` then the neighbor's router-id in dotted decimal format (A.B.C.D.).

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ip ospf statistics process-id global` command shown in the following example.

Row Heading	Description
Total	Displays the total number of packets the OSPF process receives/transmits.
Error	Displays the error count while receiving and transmitting packets by the OSPF process.
Hello	Number of OSPF Hello packets.
DDiscr	Number of database description packets.
LSReq	Number of link state request packets.
LSUpd	Number of link state update packets.
LSAck	Number of link state acknowledgement packets.
TxQ-Len	The transmission queue length.
RxQ-Len	The reception queue length.
Tx-Mark	The highest number mark in the transmission queue.
Rx-Mark	The highest number mark in the reception queue.
Hello-Q	The queue, for transmission or reception, for the hello packets.
LSR-Q	The queue, for transmission or reception, for the link state request packets.

Row Heading	Description
Other-Q	The queue, for transmission or reception, for the link state acknowledgement, database description, and update packets.

The following describes the error definitions for the `show ip ospf statistics` *`process-id`* `global` command.

Error Type	Description
Intf_Down	Received packets on an interface that is either down or OSPF is not enabled.
Non-Dr	Received packets with a destination address of ALL_DRS even though SELF is not a designated router.
Self-Org	Receive the self originated packet.
Wrong_Len	The received packet length is different to what was indicated in the OSPF header.
Invld-Nbr	LSA, LSR, LSU, and DDB are received from a peer which is not a neighbor peer.
Nbr-State	LSA, LSR, and LSU are received from a neighbor with stats less than the loading state.
Auth-Error	Simple authentication error.
MD5-Error	MD5 error
Cksum-Err	Checksum Error
Version	Version mismatch
AreaMismatch	Area mismatch
Conf-Issue	The received hello packet has a different hello or dead interval than the configuration.
No-Buffer	Buffer allocation failure.
Seq-no	A sequence no errors occurred during the database exchange process.
Socket	Socket Read/Write operation error.
Q-overflow	Packets dropped due to queue overflow.
Unknown-Pkt	Received packet is not an OSPF packet.

Example

```
Dell#show ip ospf 1 statistics global

OSPF Packet Count
   Total Error Hello DDiscr LSReq LSUpd LSAck
RX 10    0     8     2      0     0     0
TX 10    0     10    0      0     0     0

OSPF Global Queue Length
         TxQ-Len RxQ-Len Tx-Mark Rx-Mark
Hello-Q  0       0       0       2
```

```
LSR-Q      0        0        0        0
Other-Q    0        0        0        0

Error packets (Only for RX)

Intf-Down  0   Non-Dr      0   Self-Org 0
Wrong-Len  0   Invld-Nbr   0   Nbr-State 0
Auth-Err   0   MD5-Err     0   Chksum 0
Version    0   AreaMis     0   Conf-Issues 0
No-Buffer  0   Seq-No      0   Socket 0
Q-OverFlow 0   Unkown-Pkt  0

Error packets (Only for TX)

Socket Errors    0
Dell#
```

Usage Information

The `show ip ospf` *`process-id`* `statistics` command displays the error packet count received on each interface as:

- The hello-timer remaining value for each interface
- The wait-timer remaining value for each interface
- The grace-timer remaining value for each interface
- The packet count received and transmitted for each neighbor
- Dead timer remaining value for each neighbor
- Transmit timer remaining value for each neighbor
- The LSU Q length and its highest mark for each neighbor
- The LSR Q length and its highest mark for each neighbor

Example (Statistics)

```
Dell(conf-if-te-0/6)#do show ip ospf statistics
Interface TenGigabitEthernet 0/6
  Error packets (Receive statistics)
     Intf-Down 0 Non-Dr 0 Self-Org 0
     Wrong-Len 0 Invld-Nbr 0 Nbr-State 0
     Auth-Error 0 MD5-Error 0 Cksum-Err 0
     Version 0 AreaMisMatch 0 Conf-Issue 0
     SeqNo-Err 0 Unknown-Pkt 0 Bad-LsReq 0
     RtidZero 0
  Neighbor ID 4.4.4.4
     Packet Statistics
                Hello DDiscr LSReq LSUpd LSAck
        RX  5  2  1  3  2
        TX  6  5  1  3  3
     Timers
        Hello 0 Wait 0 Grace 0
        Dead 39 Transmit 4
     Queue Statistics
        LSU-Q-Len 0 LSU-Q-Wmark 1
        LSR-Q-Len 0 LSR-Q-Wmark 1

Dell(conf-if-te-0/6)#
```

Related Commands

clear ip ospf statistics — clears the packet statistics in all interfaces and neighbors.

show ip ospf timers rate-limit

Show the LSA currently in the queue waiting for timers to expire.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] timers rate-limit
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to view LSAs corresponding to a specific VRF that are currently in queue waiting for timers to expire.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

Example

```
Dell#show ip ospf 10 timers rate-limit

List of LSAs in rate limit Queue
LSA id: 1.1.1.0 Type: 3 Adv Rtid: 3.3.3.3 Expiry time:
00:00:09.111
LSA id: 3.3.3.3 Type: 1 Adv Rtid: 3.3.3.3 Expiry time:
00:00:23.96
Dell#
```

show ip ospf topology

Display routers in directly connected areas.

S6000

Syntax

```
show ip ospf [process-id | vrf vrf-name] topology
```

Parameters

process-id	Enter the OSPF Process ID to show a specific process. If no Process ID is entered, command applies only to the first OSPF process.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF to information on routers corresponding to a specific VRF that are in directly connected areas.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series and E-Series.

Usage Information

To isolate problems with inter-area and external routes, use this command. In OSPF inter-area and external routes are calculated by adding LSA cost to the cost of reaching the router. If an inter-area or external route is not of correct cost, the display can determine if the path to the originating router is correct or not.

Example

```
Dell#show ip ospf 1 topology

Router ID  Flags Cost  Nexthop   Interface Area
3.3.3.3    E/B/-/ 1    20.0.0.3  Gi 13/1   0
```

```
1.1.1.1    E/-/-/ 1    10.0.0.1  Gi 7/1    1
Dell#
```

summary-address

To advertise one external route, set the OSPF ASBR.

S6000

Syntax

`summary-address ip-address mask [not-advertise] [tag tag-value]`

To disable summary address, use the `no summary-address ip-address mask` command.

Parameters

ip-address	Specify the IP address in dotted decimal format of the address to summarize.
mask	Specify the mask in dotted decimal format of the address to summarize.
not-advertise	(OPTIONAL) Enter the keywords `not-advertise` to suppress that match the network prefix/mask pair.
tag *tag-value*	(OPTIONAL) Enter the keyword `tag` then a value to match on routes redistributed through a route map. The range is from 0 to 4294967295.

Defaults Not configured.

Command Modes ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The `area range` command summarizes routes for the different areas.

With the `not-advertise` parameter configured, you can use this command to filter out some external routes. For example, if you want to redistribute static routes to OSPF, but you don't want OSPF to advertise routes with prefix 1.1.0.0, you can configure the summary-address 1.1.0.0 255.255.0.0 not-advertise to filter out all the routes fall in range 1.1.0.0/16.

Related Commands

area range — summarizes routes within an area.

timers spf

Set the time interval between when the switch receives a topology change and starts a shortest path first (SPF) calculation.

S6000

Syntax

`timers spf delay holdtime`

To return to the default, use the `no timers spf` command.

Parameters

delay	Enter a number as the delay. The range is from 0 to 4294967295. The default is **5 seconds**.
holdtime	Enter a number as the hold time. The range is from 0 to 4294967295. The default is **10 seconds**.

Defaults

- delay = 5 seconds
- holdtime = 10 seconds

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Added support for Multi-Process OSPF.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

Setting the *delay* and *holdtime* parameters to a low number enables the switch to an alternate path quickly but requires more CPU usage.

timers throttle lsa all

Configure LSA transmit intervals.

S6000

Syntax

```
timers throttle lsa all {start-interval | hold-interval | max-interval}
```

To return to the default, use the `no timers throttle lsa` command.

Parameters

start-interval	Set the minimum interval between initial sending and resending the same LSA. The range is from 0 to 600,000 milliseconds.
hold-interval	Set the next interval to send the same LSA. This interval is the time between sending the same LSA after the start-interval has been attempted. The range is from 1 to 600,000 milliseconds.
max-interval	Set the maximum amount of time the system waits before sending the LSA. The range is from 1 to 600,000 milliseconds.

Defaults

- start-interval: **0 msec**
- hold-interval: **5000 msec**
- max-interval: **5000 msec**

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 9.0.2.0	Introduced on the S6000..
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.8.0	Introduced on the S4810.

Usage Information

LSAs are sent after the start-interval and then after hold-interval until the maximum interval is reached. In throttling, exponential backoff is used when sending same LSA, so that the interval is multiplied until the maximum time is reached. For example, if the *start-interval 5000* and *hold-interval 1000* and *max-interval 100,000*, the LSA is sent at 5000 msec, then 1000 msec, then 2000 msec, them 4000 until 100,000 msec is reached.

timers throttle lsa arrival

Configure the LSA acceptance intervals.

S6000

Syntax

```
timers throttle lsa arrival arrival-time
```

To return to the default, use the `no timers throttle lsa` command.

Parameters

arrival-time	Set the interval between receiving the same LSA repeatedly, to allow sufficient time for the system to accept the LSA. The range is from 0 to 600,000 milliseconds.

Defaults

1000 msec

Command Modes

ROUTER OSPF

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.

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Policy-based Routing (PBR)

Policy-based routing (PBR) allows you to apply routing policies to specific interfaces. To enable PBR, create a redirect list and apply it to the interface. After the redirect list is applied to the interface, all traffic passing through the interface is subject to the rules defined in the redirect list. PBR is supported by the Dell Networking Operating System (OS).

The commands in this chapter are supported on the S6000 platform.

You can apply PBR to physical interfaces and logical interfaces (such as a link aggregation group [LAG] or virtual local area network [VLAN]). Trace lists and redirect lists do not function correctly when you configure both in the same configuration.

NOTE: Apply PBR to Layer 3 interfaces only.

description

Add a description to this redirect list.

S6000

Syntax

`description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the IP redirect list (80 characters maximum).

Defaults

none

Command Modes

REDIRECT-LIST

Command History

Version 9.4.0.0	Introduced on the S6000.
Version 8.4.2.1	Introduced on the C-Series and S-Series.
Version 8.4.2.0	Introduced on the E-Series TeraScale.
pre-Version 7.7.1.0	Introduced on the E-Series ExaScale.

Related Commands	ip redirect-list – enables an IP Redirect List.

ip redirect-group

Apply a redirect list (policy-based routing) on an interface. You can apply multiple redirect lists to an interface by entering this command multiple times.

S6000

Syntax `ip redirect-group` *`redirect-list-name`*

To remove a redirect list from an interface, use the `no ip redirect-group` *`name`* command.

Parameters

redirect-list-name	Enter the name of a configured redirect list.

Defaults none

Command Modes INTERFACE (conf-if-vl-)

Command History

Version 9.4.0.0	Introduced on the S6000.
Version 8.4.2.1	Introduced on the C-Series and S-Series.
Version 8.4.2.0	Introduced on the E-Series TeraScale.
Version 7.4.2.0	Added support for LAG and VLAN interfaces.
pre-Version 7.7.1.0	Introduced on the E-Series ExaScale.

Usage Information

You can apply any number of redirect-groups to an interface. A redirect list can contain any number of configured rules. These rules includes the next-hop IP address where the incoming traffic is to be redirected.

If the next hop address is reachable, traffic is forwarded to the specified next hop. Otherwise, the normal routing table is used to forward traffic. When a redirect-group is applied to an interface and the next-hop is reachable, the rules are added into the PBR CAM region. When incoming traffic hits an entry in the CAM, the traffic is redirected to the corresponding next-hop IP address specified in the rule.

NOTE: Apply the redirect list to physical, VLAN, or LAG interfaces only.

Related Commands

- show cam pbr – displays the content of the PBR CAM.

- show ip redirect-list – displays the redirect-list configuration.

ip redirect-list

Configure a redirect list and enter REDIRECT-LIST mode.

S6000

Syntax

`ip redirect-list` *`redirect-list-name`*

To remove a redirect list, use the `no ip redirect-list` command.

Parameters

redirect-list-name	Enter the name of a redirect list.

Defaults

none

Command Modes

CONFIGURATION

Command History

Version 9.4.0.0	Introduced on the S6000.
Version 8.4.2.1	Introduced on the C-Series and S-Series.
Version 8.4.2.0	Introduced on the E-Series TeraScale.
Version 6.5.3.0	Introduced on the E-Series ExaScale.

permit

Configure a rule for the redirect list.

S6000

Syntax

```
permit {ip-protocol-number | protocol-type} {source mask | any
| host ip-address} {destination mask | any | host ip-address}
[bit] [operators]
```

To remove the rule, use one of the following:

- If you know the filter sequence number, use the `no seq` *`sequence-number`* `syntax` command.
- You can also use the `no permit {`*`ip-protocol-number`*` | `*`protocol-type`*`} {`*`source mask`*` | any | host `*`ip-address`*`} {`*`destination mask`*` | any | host `*`ip-address`*`} [`*`bit`*`] [operators]` command.

Parameters

ip-protocol-number	Enter a number from 0 to 255 for the protocol identified in the IP protocol header.
protocol-type	Enter one of the following keywords as the protocol type: • `icmp` for internet control message protocol • `ip` for any internet protocol • `tcp` for transmission control protocol • `udp` for user datagram protocol
source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x).
any	Enter the keyword `any` to specify that all traffic is subject to the filter.
host *ip-address*	Enter the keyword `host` then he IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
bit	(OPTIONAL) For the TCP protocol type only, enter one or a combination of the following TCP flags: • `ack` = acknowledgement • `fin` = finish (no more data from the user) • `psh` = push function • `rst` = reset the connection • `syn` = synchronize sequence number • `urg` = urgent field
operator	(OPTIONAL) For TCP and UDP parameters only. Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt`= less than • `range` = inclusive range of ports (you must specify two ports for the `port`command parameter.)

Defaults none

Command Modes REDIRECT-LIST

Command History

Version 9.4.0.0	Introduced on the S6000.

Version 8.4.2.1	Introduced on the C-Series and S-Series.
Version 8.4.2.0	Introduced on the E-Series TeraScale.
Version 7.5.1.0	Introduced on the E-Series ExaScale.

redirect

Configure a rule for the redirect list.

S6000

Syntax

```
redirect {ip-address | slot/port} {ip-protocol-number |
protocol-type [bit]} {source mask | any | host ip-address}
{destination mask | any | host ip-address} [operator]
```

To remove this filter, use one of the following:

- Use the `no seq sequence-number` command if you know the filter's sequence number.
- You can also use the `no redirect {ip-address | slot/port} {ip-protocol-number [bit] | protocol-type} {source mask | any | host ip-address} {destination mask | any | host ip-address} [operator]` command.

Parameters

ip-address	Enter the IP address of the forwarding router.
slot/port	Enter the keyword `slot / port` followed by the slot/port information.
ip-protocol-number	Enter a number from 0 to 255 for the protocol identified in the IP protocol header.
protocol-type	Enter one of the following keywords as the protocol type: • `icmp` for internet control message protocol • `ip` for any internet protocol • `tcp` for transmission control protocol • `udp` for user datagram protocol
bit	(OPTIONAL) For the TCP protocol type only, enter one or a combination of the following TCP flags: • `ack` = acknowledgement • `fin` = finish (no more data from the user) • `psh` = push function • `rst` = reset the connection • `syn` = synchronize sequence number • `urg` = urgent field

source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x).
any	Enter the keyword `any` to specify that all traffic is subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
operator	(OPTIONAL) For TCP and UDP parameters only. Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt` = less than • `range` = inclusive range of ports (you must specify two ports for the`port` command parameter.)

Defaults none

Command Modes REDIRECT-LIST

Command History

Version 9.4.0.0	Introduced on the S6000.
Version 8.4.2.1	Introduced on the C-Series.
Version 8.4.2.0	Introduced on the E-Series TeraScale.

seq

Configure a filter with an assigned sequence number for the redirect list.

S6000

Syntax

```
seq sequence-number {permit | redirect {ip-address}} {ip-
protocol-number | protocol-type} {source mask | any | host ip-
address} {destination mask | any | host ip-address} [bit]
[operator]{source-port source-port| source-port-range start-
port - end-port} {destination-port destination-port|
destination-port-range start-port - end-port}
```

To delete a filter, use the `no seq sequence-number` command.

Parameters

sequence-number	Enter a number from 1 to 65535.
permit	Enter the keyword `permit` assign the sequence to the permit list.
redirect	Enter the keyword `redirect` to assign the sequence to the redirect list.
ip-address	Enter the `IP address` of the forwarding router.
ip-protocol-number	Enter the keyword `ip-protocol-number` then the number from 0 to 255 for the protocol identified in the IP protocol header.
protocol-type	Enter one of the following keywords as the protocol type: • `icmp` for internet control message protocol • `ip` for any internet protocol • `tcp` for transmission control protocol • `udp` for user datagram protocol
source	Enter the IP address of the network or host from which the packets were sent.
mask	Enter a network mask in /prefix format (/x).
any	Enter the keyword `any` to specify that all traffic is subject to the filter.
host *ip-address*	Enter the keyword `host` then the IP address to specify a host IP address.
destination	Enter the IP address of the network or host to which the packets are sent.
bit	(OPTIONAL) For the TCP protocol type only, enter one or a combination of the following TCP flags: • `ack` = acknowledgement • `fin` = finish (no more data from the user) • `psh` = push function • `rst` = reset the connection • `syn` = synchronize sequence number • `urg` = urgent field
operator	(OPTIONAL) For the TCP and UDP parameters only. Enter one of the following logical operand: • `eq` = equal to • `neq` = not equal to • `gt` = greater than • `lt`= less than

- `range` = inclusive range of ports (you must specify two ports for the port command parameter.)

source port	Enter the keywords `source-port` then the port number to be matched in the ACL rule in the ICAP rule
destination-port	Enter the keywords `destination-port` then the port number to be matched in the ACL rule in the ICAP rule.
source-port-range	Enter the keywords `Source-port-range` then the range of the start port to end port to be matched in the ACL rule in the ICAP rule.
destination-port-range	Enter the keywords `destination-port-range` then the range of the start port to end port to be matched in the ACL rule in the ICAP rule.

Defaults	none	
Command Modes	REDIRECT-LIST	
Command History	Version 9.4.0.0	Introduced on the S6000.

show cam pbr

Display the PBR CAM content.

S6000

Syntax

```
show cam pbr {[interface interface] | stack—unit slot-number
port-set number]} [summary]
```

Parameters

interface *interface*	Enter the keyword `interface` then the name of the interface.
stack–unit *number*	Enter the keyword `stack-unit` then the slot number. The range is from 0 to 11 .
port-set *number*	Enter the keywords `port-set` then the port-pipe number. The range is from 0 to 1.
summary	Enter the keyword `summary` to view only the total number of CAM entries.

Defaults	none
Command Modes	EXEC

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Usage Information

The `show cam pbr` command displays the PBR CAM content.

Example

```
Dell#show cam pbr stack-unit 0 po 0

TCP Flag: Bit 5 - URG, Bit 4 - ACK, Bit 3 - PSH, Bit 2 - RST,
Bit 1 - SYN, Bit 0 - FIN

Cam   Port VlanID Proto Tcp   Src   Dst
SrcIp
DstIp                           Next-hop          Egress
Index                   Flag  Port
Port
       MAC               Port
---------------------------------------------------------------
---------------------------------------------------------------
------------
00000 5    N/A    IP    0x0   0     0
22.22.2.22/32
33.33.3.0/24                    00:01:e8:8a:fd:76 0/0
00001 5    N/A    145   0x0   0     0
0.0.0.0/0
44.4.4.4/32                     00:01:e8:8a:fd:76 Vl 100(0/1)
00002 5    N/A    TCP   0x0   0     0
55.1.3.0/24
66.6.6.6/32                     00:01:e8:8a:fd:76 Po 128
00003 5    N/A    UDP   0x0   0     0
55.1.3.0/24
66.6.6.6/32                     00:01:e8:8a:fd:76 Po 128
00004 5    N/A    IP    0x0   0     0
0.0.0.0/0
0.0.0.0/0                       00:01:e8:8a:fd:76 Vl 1020(Po
100)
Dell#
```

Related Commands

- ip redirect-group – applies a redirect group to an interface.
- show ip redirect-list – displays the redirect-list configuration.

show ip redirect-list

View the redirect list configuration and the interfaces it is applied to.

S6000

Syntax

`show ip redirect-list` *`redirect-list-name`*

Parameters

redirect-list-name	Enter the name of a configured Redirect list.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000, and Z9000.

Example

```
Dell#show ip redirect-list test_pbr

IP redirect-list test_pbr:
 Defined as:
  seq 5 redirect 1.1.1.2 ip host 22.22.2.22 33.33.3.0/24, Next-
hop reachable (via Te 0/0), ARP resolved
,
  seq 10 redirect 2.1.1.2 145 any host 44.4.4.4, Next-hop
reachable (via Vl 100), ARP resolved
,
  seq 15 redirect 3.1.1.2 tcp 55.1.3.0/24 host 66.6.6.6, Next-
hop reachable (via Po 128), ARP resolved
,
  seq 20 redirect 3.1.1.2 udp 55.1.3.0/24 host 66.6.6.6, Next-
hop reachable (via Po 128), ARP resolved
,
  seq 25 redirect 4.1.1.2 ip any any, Next-hop reachable (via
Vl 1020), ARP resolved
,
 Applied interfaces:
  Te 0/5
Dell#
```

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PIM-Sparse Mode (PIM-SM)

The protocol-independent multicast (PIM) commands are supported by the Dell Networking operating software on the S6000platform.

IPv4 PIM-Sparse Mode Commands

The following describes the IPv4 PIM-sparse mode (PIM-SM) commands.

clear ip pim rp-mapping

The bootstrap router (BSR) feature uses this command to remove all or particular rendezvous point (RP) advertisement.

S6000

Syntax

```
clear ip pim rp-mapping rp-address
```

Parameters

rp-address	(OPTIONAL) Enter the RP address in dotted decimal format (A.B.C.D).

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

clear ip pim tib

Clear PIM tree information from the PIM database.

S6000

Syntax	`clear ip pim tib [group]`
Parameters	**group**: (OPTIONAL) Enter the multicast group address in dotted decimal format (A.B.C.D).
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

Usage Information

If you use this command on a local VLT node, all multicast routes from the local PIM TIB, the entire multicast route table, and all the entries in the data plane are deleted. The local VLT node sends a request to the peer VLT node to download multicast routes learned by the peer. Both local and synced routes are removed from the local VLT node multicast route table. The peer VLT node clears synced routes from the node.

If you use this command on a peer VLT node, only the synced routes are deleted from the multicast route table.

debug ip pim

View IP PIM debugging messages.

S6000

Syntax

```
debug ip pim [bsr | events | group | packet [in | out] |
register | state | timer [assert | hello | joinprune |
register]]
```

To disable PIM debugging, use the `no debug ip pim` command or use the `undebug all to disable all debugging` command.

Parameters

bsr	(OPTIONAL) Enter the keyword `bsr` to view PIM Candidate RP/BSR activities.
events	(OPTIONAL) Enter the keyword `group` to view PIM messages for a specific group.
group	(OPTIONAL) Enter the keyword `group` to view PIM messages for a specific group.
packet [in | out]	(OPTIONAL) Enter the keyword `packet` to view PIM packets. Enter one of the optional parameters: • `in`: to view incoming packets • `out`: to view outgoing packets
register	(OPTIONAL) Enter the keyword `register` to view PIM register address in dotted decimal format (A.B.C.D).
state	(OPTIONAL) Enter the keyword `state` to view PIM state changes.
timer [assert | hello | joinprune | register]	(OPTIONAL) Enter the keyword `timer` to view PIM timers. Enter one of the optional parameters: • `assert`: to view the assertion timer • `hello`: to view the PIM neighbor keepalive timer • `joinprune`: to view the expiry timer (join/prune timer) • `register`: to view the register suppression timer

Defaults Disabled.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.

Version 7.8.1.0	Introduced on the S-Series.

ip pim bsr-border

Define the border of PIM domain by filtering inbound and outbound PIM-BSR messages per interface.

S6000

Syntax

`ip pim bsr-border`

To return to the default value, use the `no ip pim bsr-border` command.

Defaults

Disabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

Usage Information

This command is applied to the subsequent PIM-BSR. Existing BSR advertisements are cleaned up by time-out. To clean the candidate RP advertisements, use the `clear ip pim rp-mapping` command.

ip pim bsr-candidate

To join the Bootstrap election process, configure the PIM router.

S6000

Syntax

`ip pim bsr-candidate` *`interface`* `[`*`hash-mask-length`*`] [`*`priority`*`]`

To return to the default value, use the `no ip pim bsr-candidate` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383.

- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

hash-mask-length	(OPTIONAL) Enter the hash mask length. The range is from zero (0) to 32. The default is **30**.
priority	(OPTIONAL) Enter the priority used in Bootstrap election process. The range is from zero (0) to 255. The default is **zero (0)**.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 6.1.1.0	Added support for the VLAN interface.

ip pim dr-priority

Change the designated router (DR) priority for the interface.

S6000

Syntax `ip pim dr-priority *priority-value*`

To remove the DR priority value assigned, use the `no ip pim dr-priority` command.

Parameters

priority-value	Enter a number. Preference is given to larger/higher number. The range is from 0 to 4294967294. The default is 1.

Defaults **1**

Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series on port-channels and the S-Series.

Usage Information	The router with the largest value assigned to an interface becomes the designated router. If two interfaces contain the same designated router priority value, the interface with the largest interface IP address becomes the designated router.

ip pim join-filter

Permit or deny PIM Join/Prune messages on an interface using an extended IP access list. This command prevents the PIM-SM router from creating state based on multicast source and/or group.

S6000

Syntax `ip pim join-filter` *`ext-access-list`* `{in | out}`

To remove the access list, use the `no ip pim join-filter ext-access-list {in | out}` command.

Parameters

ext-access-list	Enter the name of an extended access list.
in	Enter this keyword to apply the access list to inbound traffic.
out	Enter this keyword to apply the access list to outbound traffic.

Defaults	none
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.
Version 7.7.1.0	Introduced on the E-Series.

Example

```
Dell(conf)# ip access-list extended iptv-channels
Dell(config-ext-nacl)# permit ip 10.1.2.3/24 225.1.1.0/24
Dell(config-ext-nacl)# permit ip any 232.1.1.0/24
Dell(config-ext-nacl)# permit ip 100.1.1.0/16 any
Dell(config-if-gi-1/1)# ip pim join-filter iptv-channels in
Dell(config-if-gi-1/1)# ip pim join-filter iptv-channels out
```

Related Commands

ip access-list extended — configure an access list based on IP addresses or protocols.

ip pim neighbor-filter

To prevent a router from participating in protocol independent multicast (PIM), configure this feature.

S6000

Syntax

`ip pim neighbor-filter {access-list}`

To remove the restriction, use the `no ip pim neighbor-filter {access-list}` command.

Parameters

access-list	Enter the name of a standard access list. Maximum 16 characters.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series and S-Series.
Version 7.6.1.0	Introduced on the E-Series.

Usage Information

Do not enter this command before creating the access-list.

ip pim query-interval

Change the frequency of PIM Router-Query messages.

S6000

Syntax

`ip pim query-interval seconds`

To return to the default value, use the `no ip pim query-interval seconds` command.

Parameters

seconds	Enter a number as the number of seconds between router query messages. The range is from 0 to 65535. The default is **30 seconds**.

Defaults

30 seconds

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.

ip pim register-filter

To prevent a PIM source DR from sending register packets to an RP for the specified multicast source and group, use this feature.

S6000

Syntax	`ip pim register-filter` *`access-list`* To return to the default, use the `no ip pim register-filter access-list` command.
Parameters	*access-list* — Enter the name of an extended access list. Maximum 16 characters.
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.
Version 7.6.1.0	Introduced

Usage Information

The access name is an extended IP access list that denies PIM register packets to RP at the source DR based on the multicast and group addresses. Do not enter this command before creating the access-list.

ip pim rp-address

Configure a static PIM rendezvous point (RP) address for a group or access-list.

S6000

Syntax

`ip pim rp-address` *`address`* `{group-address` *`group-address mask`*`} override`

To remove an RP address, use the `no ip pim rp-address` *`address`* `{group-address` *`group-address mask`*`} override` command.

Parameters

address	Enter the RP address in dotted decimal format (A.B.C.D).
group-address *group-address mask*	Enter the keywords `group-address` then a group-address mask, in dotted decimal format (/xx), to assign that group address to the RP.
override	Enter the keyword `override` to override the BSR updates with static RP. The override takes effect immediately during enable/disable. **NOTE:** This option is applicable to multicast group range.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

First-hop routers use this address by to send register packets on behalf of source multicast hosts. The RP addresses are stored in the order in which they are entered. RP addresses learned using BSR take priority over static RP addresses. Without the `override` option, RPs advertised by the BSR updates take precedence over the statically configured RPs.

ip pim rp-candidate

To send out a Candidate-RP-Advertisement message to the bootstrap (BS) router or define group prefixes that are defined with the RP address to PIM BSR, configure a PIM router.

S6000

Syntax `ip pim rp-candidate {interface [priority]`

To return to the default value, use the `no ip pim rp-candidate {interface [priority]` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.
priority	(OPTIONAL) Enter the priority used in Bootstrap election process. The range is zero (0) to 255. The default is **192**.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

Priority is stored at BSR router when receiving a Candidate-RP-Advertisement.

ip pim sparse-mode

Enable PIM sparse mode and IGMP on the interface.

S6000

Syntax `ip pim sparse-mode`

To disable PIM sparse mode and IGMP, use the `no ip pim sparse-mode` command.

Defaults Disabled.

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.

Usage Information The interface must be enabled (the `no shutdown` command) and not have the `switchport` command configured. Multicast must also be enabled globally (using the `ip multicast-lag-hashing` command). PIM is supported on the port-channel interface.

ip pim sparse-mode sg-expiry-timer

Enable expiry timers globally for all sources, or for a specific set of (S,G) pairs an access list defines.

S6000

Syntax `ip pim sparse-mode sg-expiry-timer seconds [access-list name]`

To disable configured timers and return to default mode, use the `no ip pim sparse-mode sg-expiry-timer` command.

Parameters

seconds	Enter the number of seconds the S, G entries are retained. The range is from 211 to 86400.
access-list name	(OPTIONAL) Enter the name of a previously configured Extended ACL to enable the expiry time to specified S,G entries.

Defaults Disabled. The default expiry timer (with no times configured) is 210 sec.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the C-Series for the port-channels and the S-Series.
Version 7.7.1.1	Introduced

Usage Information

This command configures an expiration timer for all S.G entries, unless they are assigned to an Extended ACL.

ip pim spt-threshold

To switch to the shortest path tree when the traffic reaches the specified threshold value, configure the PIM router.

Syntax

```
ip pim spt-threshold value | infinity
```

To return to the default value, use the `no ip pim spt-threshold` command.

Parameters

value	(OPTIONAL) Enter the traffic value in kilobits per second. The default is **10 packets per second**. A value of zero (0) causes a switchover on the first packet.
infinity	(OPTIONAL) Enter the keyword `infinity` to never switch to the source-tree.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.12.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.

Usage Information	This command is applicable to last hop routers on the shared tree towards the rendezvous point (RP).

show ip pim bsr-router

View information on the Bootstrap router.

S6000

Syntax `show ip pim bsr-router`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

Example

```
E600-7-rpm0#show ip pim bsr-router
PIMv2 Bootstrap information
This system is the Bootstrap Router (v2)
  BSR address: 7.7.7.7 (?)
  Uptime: 16:59:06, BSR Priority: 0, Hash mask length: 30
  Next bootstrap message in 00:00:08

This system is a candidate BSR
  Candidate BSR address: 7.7.7.7, priority: 0, hash mask
length: 30
```

show ip pim interface

View information on the interfaces with IP PIM enabled.

S6000

Syntax	`show ip pim interface`
Command Modes	• EXEC • EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip pim interface` command shown in the following example.

Field	Description
Address	Lists the IP addresses of the interfaces participating in PIM.
Interface	List the interface type, with either slot/port information or ID (VLAN or Port Channel), of the interfaces participating in PIM.
Ver/Mode	Displays the PIM version number and mode for each interface participating in PIM: • v2 = PIM version 2 • S = PIM Sparse mode
Nbr Count	Displays the number of PIM neighbors discovered over this interface.
Query Intvl	Displays the query interval for Router Query messages on that interface (configured with `ip pim query-interval` command).

Field	Description
DR Prio	Displays the Designated Router priority value configured on the interface (use the `ip pim dr-priority` command).
DR	Displays the IP address of the Designated Router for that interface.

Example

```
E600-7-RPM0#show ip pim interface
Address         Interface Ver/ Nbr   Query DR   DR
                          Mode Count Intvl Prio
172.21.200.254 Gi 7/9    v2/S 0     30 1  172.21.200.254
172.60.1.2     Gi 7/11   v2/S 0     30 1  172.60.1.2
192.3.1.1      Gi 7/16   v2/S 1     30 1  192.3.1.1
192.4.1.1      Gi 13/5   v2/S 0     30 1  192.4.1.1
172.21.110.1   Gi 13/6   v2/S 0     30 1  172.21.110.1
172.21.203.1   Gi 13/7   v2/S 0     30 1  172.21.203.1
```

show ip pim neighbor

View PIM neighbors.

S6000

Syntax `show ip pim neighbor`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip pim neighbor` command shown in the following example.

Field	Description
Neighbor address	Displays the IP address of the PIM neighbor.

Field	Description
Interface	List the interface type, with either slot/port information or ID (VLAN or Port Channel), on which the PIM neighbor was found.
Uptime/expires	Displays the amount of time the neighbor has been up then the amount of time until the neighbor is removed from the multicast routing table (that is, until the neighbor hold time expires).
Ver	Displays the PIM version number. • v2 = PIM version 2
DR prio/Mode	Displays the Designated Router priority and the mode. • 1 = default Designated Router priority (use the `ip pim dr-priority` command) • DR = Designated Router • S = Sparse mode

Example

```
Dell#show ip pim neighbor
Neighbor   Interface  Uptime/Expires    Ver   DR
Address                                       Prio/Mode
127.87.3.4 Gi 7/16    09:44:58/00:01:24  v2   1 / S
Dell#
```

show ip pim rp

View all multicast groups-to-RP mappings.

S6000

Syntax `show ip pim rp [mapping | group-address]`

Parameters

mapping	(OPTIONAL) Enter the keyword `mapping` to display the multicast groups-to-RP mapping and information on how RP is learnt.
group-address	(OPTIONAL) Enter the multicast group address mask in dotted decimal format to view RP for a specific group.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

Example

```
Dell#sh ip pim rp
Group           RP
224.2.197.115   165.87.20.4
224.2.217.146   165.87.20.4
224.3.3.3       165.87.20.4
225.1.2.1       165.87.20.4
225.1.2.2       165.87.20.4
229.1.2.1       165.87.20.4
229.1.2.2       165.87.20.4
Dell#
```

Example (Mapping)

```
Dell#sh ip pim rp mapping
Group(s): 224.0.0.0/4
  RP: 165.87.20.4, v2
    Info source: 165.87.20.5, via bootstrap, priority 0
      Uptime: 00:03:11, expires: 00:02:46
  RP: 165.87.20.3, v2
    Info source: 165.87.20.5, via bootstrap, priority 0
      Uptime: 00:03:11, expires: 00:03:03

Dell#
```

Example (Address)

```
Dell#sh ip pim rp 229.1.2.1
Group         RP
229.1.2.1    165.87.20.4

Dell#
```

show ip pim tib

View the PIM tree information base (TIB).

S6000

Syntax `show ip pim tib [group-address [source-address]]`

Parameters

group-address	(OPTIONAL) Enter the group address in dotted decimal format (A.B.C.D).
source-address	(OPTIONAL) Enter the source address in dotted decimal format (A.B.C.D).

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.8.1.0	Introduced on the S-Series.

Usage Information

The following describes the `show ip pim tib` command shown in the following example.

Field	Description
(S, G)	Displays the entry in the multicast PIM database.
uptime	Displays the amount of time the entry has been in the PIM route table.
expires	Displays the amount of time until the entry expires and is removed from the database.
RP	Displays the IP address of the RP/source for this entry.
flags	List the flags to define the entries: • D = PIM Dense Mode • S = PIM Sparse Mode • C = directly connected • L = local to the multicast group • P = route was pruned • R = the forwarding entry is pointing toward the RP • F = Dell Networking OS is registering this entry for a multicast source • T = packets were received via Shortest Tree Path • J = first packet from the last hop router is received and the entry is ready to switch to SPT • K = acknowledge pending state

Field	Description
Incoming interface	Displays the reverse path forwarding (RPF) interface towards the RP/ source.
RPF neighbor	Displays the next hop from this interface towards the RP/ source.
Outgoing interface list:	Lists the interfaces that meet one of the following criteria: • a directly connect member of the Group • statically configured member of the Group • received a (*,G) Join message

Example

```
Dell#show ip pim tib

PIM Multicast Routing Table
Flags:D- Dense, S- Sparse, C- Connected, L- Local, P- Pruned,
      R- RP-bit set, F- Register flag, T- SPT-bit set, J- Join
SPT,
      M- MSDP created entry, A- Candidate for MSDP
Advertisement,
      K- Ack-Pending State
Timers: Uptime/Expires
Interface state: Interface, next-Hop, State/Mode

(*, 226.1.1.1), uptime 01:29:19, expires 00:00:52, RP
10.211.2.1, flags: SCJ
  Incoming interface: GigabitEthernet 4/23, RPF neighbor
10.211.1.2
  Outgoing interface list:
    GigabitEthernet 8/0

(*, 226.1.1.2), uptime 00:18:08, expires 00:00:52, RP
10.211.2.1, flags: SCJ
  Incoming interface: GigabitEthernet 4/23, RPF neighbor
10.211.1.2
  Outgoing interface list:
    GigabitEthernet 8/0

(*, 226.1.1.3), uptime 00:18:08, expires 00:00:52, RP
10.211.2.1, flags: SCJ
  Incoming interface: GigabitEthernet 4/23, RPF neighbor
10.211.1.2
  Outgoing interface list:
    GigabitEthernet 8/0

(*, 226.1.1.4), uptime 00:18:08, expires 00:00:52, RP
10.211.2.1, flags: SCJ
  Incoming interface: GigabitEthernet 4/23, RPF neighbor
10.211.1.2
  Outgoing interface list:
    GigabitEthernet 8/0
```

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Port Monitoring

The port monitoring feature allows you to monitor network traffic by forwarding a copy of each incoming or outgoing packet from one port to another port.

The commands in this chapter are supported on the S6000 platform.

Important Points to Remember

- Port monitoring is supported on physical ports and logical interfaces, such as Port Channels and virtual local area networks (VLANs).
- The monitoring (destination, “MG”) and monitored (source, “MD”) ports must be on the same switch.
- In general, a monitoring port should have `no ip address` and `no shutdown` as the only configuration; Dell Networking operating software permits a limited set of commands for monitoring ports; display them using the `?` command. A monitoring port also may not be a member of a VLAN.
- A total of 4 MG may be configured in a single port-pipe.
- MG and MD ports can be reside anywhere across a port-pipe.
- Dell Networking operating software supports multiple source ports to be monitored by a single destination port in one monitor session.
- One monitor session can have only one MG port.

NOTE: The monitoring port should not be a part of any other configuration.

description

Enter a description of this monitoring session.

S6000

Syntax	`description {`*`description`*`}` To remove the description, use the `no description {`*`description`*`}` command.
Parameters	**description** — Enter a description regarding this session (80 characters maximum).
Defaults	none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-7.7.1.0	Introduced on the E-Series.

Related Commands

monitor session — enables a monitoring session.

monitor session

Create a session for monitoring traffic with port monitoring.

S6000

Syntax

`monitor session session-ID (type { rpm | erpm })`

To delete a session, use the `no monitor session session-ID` command.

To delete all monitor sessions, use the `no monitor session all` command.

Parameters

session-ID	Enter a session identification number. The range is from 0 to 65535.
type rpm | erpm	Specifies one of the following type: • `rpm`: to create remote port monitoring session. • `erpm`: to create encapsulated remote port monitoring session.

Defaults

none

Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added support for the rpm/erpm option on the S6000.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.2.0	Introduced on the MXL.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

The `monitor` command is saved in the running configuration at Monitor Session mode level and can be restored after a chassis reload.

Example

```
Dell(conf)# monitor session 60
Dell(conf-mon-sess-60)
```

Related Command

show monitor session — displays the monitor session.

show running-config monitor session — displays the running configuration of a monitor session.

show config

Display the current monitor session configuration.

S6000

Syntax	`show config`
Defaults	none
Command Modes	MONITOR SESSION (conf-mon-*sess-session-ID*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.7.0	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Example

```
Dell(conf-mon-sess-1)#show config
!
monitor session 1
 source TenGigabitEthernet 0/1 destination Port-channel 1
direction rx
```

show monitor session

Display information about monitoring sessions.

S6000

Syntax

`show monitor session {`*`session-ID`*`}`

To display monitoring information for all sessions, use the `show monitor session` command.

Parameters

session-ID	(OPTIONAL) Enter a session identification number. The range is from 0 to 65535.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.0.0	Added support for the RPM / ERPM.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Example

```
Dell#show monitor session
  SessID  Source         Destination        Dir  Mode  Source
IP      Dest IP
  ------  ------         -----------        ---  ----
---------      ---------
     1    Vl 10             Te 0/8          rx   Flow    N/
A          N/A
```

Related Commands

monitor session — creates a monitoring session.

show running-config monitor session

Display the running configuration of all monitor sessions or a specific session.

S6000

Syntax

`show running-config monitor session {session-ID}`

To display the running configuration for all monitor sessions, use the `show running-config monitor session` command.

Parameters

session-ID	(OPTIONAL) Enter a session identification number. The range from 0 to 65535.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the S4810.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

The `monitoring` command is saved in the running configuration at the Monitor Session mode level and can be restored after a chassis reload.

Example

```
Dell# show running-config monitor session
!
monitor session 1
source TenGigabitEthernet 0/1 destination TenGigabitEthernet
0/2 direction rx
```

Related Commands

monitor session — creates a monitoring session.

show monitor session — displays a monitoring session.

source (port monitoring)

Configure a port monitor source.

S6000

Syntax

`source` *`interface`* `|` *`range`* `destination` *`interface`* `direction {rx | tx | both}`

To disable a monitor source, use the `no source` *`interface`* `destination` *`interface`* `direction {rx | tx | both}` command.

Parameters

source *interface*	Enter the one of the following keywords and slot/port information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface enter the keyword `VLAN` followed by a number from 1 to 4094. • For a port channel interface, enter the keyword `port-channel` followed by the port-channel id .
range	Enter the keyword `range` to specify the list of interfaces.

destination	Enter the keyword `destination` to specify the destination interface. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a port channel interface, enter the keyword `port-channel` followed by the port-channel id .
interface	Enter the one of the following keywords and slot/port information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN interface enter the keyword `VLAN` followed by a number from 1 to 4094. • For a port channel interface, enter the keyword `port-channel` followed by the port-channel id .
direction {rx | tx | both}	Enter the keyword `direction` then one of the packet directional indicators. • `rx`: to monitor receiving packets only. • `tx`: to monitor transmitting packets only. • `both`: to monitor both transmitting and receiving packets.

Defaults none

Command Modes MONITOR SESSION (conf-mon- *sess-session-ID*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.0.0	Added support for Source and destination.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.

Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Example

```
Dell# monitor session 0
source Port-channel 10 destination TenGigabitEthernet 0/33
direction tx
```

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Private VLAN (PVLAN)

The private VLAN (PVLAN) feature of the Dell Networking operating software is supported on the S6000 platforms.

Private VLANs extend the Dell Networking OS security suite by providing Layer 2 isolation between ports within the same private VLAN. A private VLAN partitions a traditional VLAN into subdomains identified by a primary and secondary VLAN pair. The Dell Networking OS private VLAN implementation is based on RFC 3069.

For more information, refer to the following commands. The command output is augmented in Dell Networking OS version 7.8.1.0 at later to provide PVLAN data:

- show arp
- show vlan

Private VLAN Concepts

Primary VLAN:

The primary VLAN is the base VLAN and can have multiple secondary VLANs. There are two types of secondary VLAN — community VLAN and isolated VLAN:

- A primary VLAN can have any number of community VLANs and isolated VLANs.
- Private VLANs block all traffic to isolated ports except traffic from promiscuous ports. Traffic received from an isolated port is forwarded only to promiscuous ports or trunk ports.

Community VLAN:

A community VLAN is a secondary VLAN of the primary VLAN:

- Ports in a community VLAN can talk to each other. Also, all ports in a community VLAN can talk to all promiscuous ports in the primary VLAN and vice versa.
- Devices on a community VLAN can communicate with each other using member ports, while devices in an isolated VLAN cannot.

Isolated VLAN:

An isolated VLAN is a secondary VLAN of the primary VLAN:

- Ports in an isolated VLAN cannot talk to each other. Servers would be mostly connected to isolated VLAN ports.
- Isolated ports can talk to promiscuous ports in the primary VLAN, and vice versa.

Port Types:

- *Community port*: A community port is a port that belongs to a community VLAN and is allowed to communicate with other ports in the same community VLAN and with promiscuous ports.
- *Isolated port*: An isolated port is a port that, in Layer 2, can only communicate with promiscuous ports that are in the same PVLAN.
- *Promiscuous port*: A promiscuous port is a port that is allowed to communicate with any other port type.
- *Trunk port*: A trunk port carries VLAN traffic across switches:
  - A trunk port in a PVLAN is always tagged.
  - A trunk port in Tagged mode carries primary or secondary VLAN traffic. The tag on the packet helps identify the VLAN to which the packet belongs.
  - A trunk port can also belong to a regular VLAN (non-private VLAN).

ip local-proxy-arp

Enable/disable Layer 3 communication between secondary VLANs in a private VLAN.

S6000

Syntax

```
[no] ip local-proxy-arp
```

To disable Layer 3 communication between secondary VLANs in a private VLAN, use the `no ip local-proxy-arp` command in INTERFACE VLAN mode for the primary VLAN.

To disable Layer 3 communication in a particular secondary VLAN, use the `no ip local-proxy-arp` command in INTERFACE VLAN mode for the selected secondary VLAN.

NOTE: Even after you disable `ip-local-proxy-arp` (use `no ip-local-proxy-arp`) in a secondary VLAN, Layer 3 communication may happen between some secondary VLAN hosts, until the address resolution protocol (ARP) timeout happens on those secondary VLAN hosts.

Defaults

Layer 3 communication is disabled between secondary VLANs in a private VLAN.

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

private-vlan mode — sets the mode of the selected VLAN to community, isolated, or primary.

private-vlan mapping secondary-vlan — maps secondary VLANs to the selected primary VLAN.

show arp — displays the ARP table.

switchport mode private-vlan — sets PVLAN mode of the selected port.

private-vlan mode

Set PVLAN mode of the selected VLAN to community, isolated, or primary.

S6000

Syntax

`[no] private-vlan mode {community | isolated | primary}`

To remove the PVLAN configuration, use the `no private-vlan mode {community | isolated | primary}` command syntax.

Parameters

community	Enter the keyword `community` to set the VLAN as a community VLAN.
isolated	Enter the keyword `isolated` to configure the VLAN as an isolated VLAN.
primary	Enter the keyword `primary` to configure the VLAN as a primary VLAN.

Defaults

none

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

The VLAN:

- can be in only one mode, either `community`, `isolated`, or `primary`.
- mode ode to `community` or `isolated` even before associating it to a primary VLAN. This secondary VLAN continues to work normally as a normal VLAN even though it is not associated to a primary VLAN. (A syslog message indicates this.)
- must not have a port in it when VLAN mode is being set.

Only ports (and port channels) configured as promiscuous, host, or PVLAN trunk ports (as previously described) can be added to the PVLAN. No other regular ports can be added to the PVLAN.

After using this command to configure a VLAN as a primary VLAN, use the `private-vlan mapping secondary-vlan` command to map secondary VLANs to this VLAN.

Related Commands

private-vlan mapping secondary-vlan — maps secondary VLANs to the selected primary VLAN.

switchport mode private-vlan — sets PVLAN mode of the selected port.

private-vlan mapping secondary-vlan

Map secondary VLANs to the selected primary VLAN.

S6000

Syntax

```
[no] private-vlan mapping secondary-vlan vlan-list
```

To remove specific secondary VLANs from the configuration, use the `no private-vlan mapping secondary-vlan vlan-list` command syntax.

Parameters

vlan-list	Enter the list of secondary VLANs to associate with the selected primary VLAN. The list can be in comma-delimited or hyphenated-range format, following the convention for the range input.

Defaults

none

Command Modes

INTERFACE VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

The list of secondary VLANs can be:

- Specified in comma-delimited or hyphenated-range format.
- Specified with this command even before they have been created.
- Amended by specifying the new secondary VLAN to be added to the list.

Related Commands

private-vlan mode — sets the mode of the selected VLAN to community, isolated, or primary.

switchport mode private-vlan — sets PVLAN mode of the selected port.

switchport mode private-vlan

Set PVLAN mode of the selected port.

S6000

Syntax

`[no] switchport mode private-vlan {host | promiscuous | trunk}`

To remove PVLAN mode from the selected port, use the `no switchport mode private-vlan` command.

Parameters

host	Enter the keyword `host` to configure the selected port or port channel as an isolated interface in a PVLAN.
promiscuous	Enter the keyword `promiscuous` to configure the selected port or port channel as an promiscuous interface.
trunk	Enter the keyword `trunk` to configure the selected port or port channel as a trunk port in a PVLAN.

Defaults

Disabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

The assignment of the various PVLAN port types to port and port channel (LAG) interfaces is shown in the following example.

Example

```
Dell#conf
Dell(conf)#interface GigabitEthernet 2/1
Dell(conf-if-gi-2/1)#switchport mode private-vlan promiscuous

Dell(conf)#interface GigabitEthernet 2/2
Dell(conf-if-gi-2/2)#switchport mode private-vlan host

Dell(conf)#interface GigabitEthernet 2/3
Dell(conf-if-gi-2/3)#switchport mode private-vlan trunk

Dell(conf)#interface port-channel 10
Dell(conf-if-gi-2/3)#switchport mode private-vlan promiscuous
```

Related Commands

private-vlan mode — sets the mode of the selected VLAN to community, isolated, or primary.

private-vlan mapping secondary-vlan — sets the mode of the selected VLAN to primary and then associates the secondary VLANs to it.

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Per-VLAN Spanning Tree Plus (PVST+)

The Dell Networking operating software implementation of per-VLAN spanning tree plus (PVST+) is based on the IEEE 802.1w standard spanning tree protocol.

Dell Networking OS supports PVST+ on the S6000 platform.

NOTE: For easier command line entry, the plus (+) sign is not used at the command line.

description

Enter a description of the PVST+.

S6000

Syntax	`description {description}` To remove the description, use the `no description {description}` command.
Parameters	*description* — Enter a description to identify the spanning tree (80 characters maximum).
Defaults	none
Command Modes	SPANNING TREE PVST+ (The prompt is “config-pvst”.)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
pre-Version 7.7.1.1	Introduced.

Related Commands	protocol spanning-tree pvst — enter SPANNING TREE mode on the switch.

disable

Disable PVST+ globally.

S6000

Syntax `disable`

To enable PVST+, use the `no disable` command.

Defaults Disabled.

Command Modes CONFIGURATION (conf-pvst)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands protocol spanning-tree pvst — enter PVST+ mode.

extend system-id

To augment the Bridge ID with a VLAN ID so that PVST+ differentiate between BPDUs for each VLAN, use extend system ID. If the VLAN receives a BPDU meant for another VLAN, PVST+ does not detect a loop, and both ports can remain in Forwarding state.

S6000

Syntax

`extend system-id`

Defaults

Disabled

Command Modes

PROTOCOL PVST

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced.

Example

```
Dell(conf-pvst)#do show spanning-tree pvst vlan 5 brief
VLAN 5
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 32773, Address 0001.e832.73f7
Root Bridge hello time 2, max age 20, forward delay 15
Bridge ID Priority 32773 (priority 32768 sys-id-ext 5),
Address 0001.e832.73f7
We are the root of Vlan 5
Configured hello time 2, max age 20, forward delay 15

Interface Designated
Name    PortID  Prio  Cost  Sts Cost Bridge ID      PortID
-------------------------------------------------------------
Gi 0/10 128.140 128  200000 FWD 0   32773 0001.e832.73f7
128.140
Gi 0/12 128.142 128  200000 DIS 0   32773 0001.e832.73f7
128.142

Interface
Name     Role PortID  Prio  Cost  Sts Cost Link-type Edge
--------------------------------------------------------
Gi 0/10  Desg 128.140 128  200000 FWD 0    P2P       No
Gi 0/12  Dis  128.142 128  200000 DIS 0    P2P       No
```

Related Commands

protocol spanning-tree pvst – enter SPANNING TREE mode on the switch.

protocol spanning-tree pvst

To enable PVST+ on a device, enter the PVST+ mode.

S6000

Syntax	`protocol spanning-tree pvst` To disable PVST+, use the `disable` command.
Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 8.3.1.0	Introduced.

Example

```
Dell#conf
Dell(conf)#protocol spanning-tree pvst
Dell(conf-pvst)#no disable
Dell(conf-pvst)#vlan 2 bridge-priority 4096
Dell(conf-pvst)#vlan 3 bridge-priority 16384
Dell(conf-pvst)#
Dell(conf-pvst)#show config
!
protocol spanning-tree pvst
  no disable
  vlan 2 bridge-priority 4096
  vlan 3 bridge-priority 16384
Dell#
```

Usage Information	After you enable PVST+, the device runs an STP instance for each VLAN it supports.
Related Commands	disable — disables PVST+. show spanning-tree pvst — displays the PVST+ configuration.

show spanning-tree pvst

View the Per-VLAN spanning tree configuration.

S6000

Syntax

```
show spanning-tree pvst [vlan vlan-id] [brief] [guard]
```

Parameters

vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then the VLAN ID. The range is 1 to 4094.
brief	(OPTIONAL) Enter the keyword `brief` to view a synopsis of the PVST+ configuration information.
interface	(OPTIONAL) Enter one of the interface keywords along with the slot/port information: • For a Port Channel interface, enter the keyword `port-channel` then a number: The range is 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
guard	(OPTIONAL) Enter the keyword `guard` to display the type of guard enabled on a PVST interface and the current port state.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.4.2.1	Support for the optional `guard` keyword was added on the C-Series, S-Series, and E-Series TeraScale.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Expanded to display port error disable state (EDS) caused by loopback BPDU inconsistency and Port VLAN ID inconsistency.
Version 6.2.1.1	Introduced.

Usage Information

The following describes the `show spanning-tree pvst` command shown in the following examples.

Field	Description
Interface Name	PVST interface.
Instance	PVST instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), or shut down (EDS Shut).
Guard Type	Type of STP guard configured (Root, Loop, or BPDU guard).

Example (Brief)

```
Dell#show spanning-tree pvst vlan 3 brief
VLAN 3
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 4096, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15
Bridge ID Priority 16384, Address 0001.e805.e306
Configured hello time 2, max age 20, forward delay 15

Interface                              Designated
Name    PortID  Prio Cost Sts Cost   Bridge ID      PortID
----------------------------------------------------------
Gi 1/0  128.130 128 20000 FWD 20000 4096 0001.e801.6aa8
128.426
Gi 1/1  128.131 128 20000 BLK 20000 4096 0001.e801.6aa8
128.427
Gi 1/16 128.146 128 20000 FWD 20000 16384 0001.e805.e306
128.146
Gi 1/17 128.147 128 20000 FWD 20000 16384 0001.e805.e306
128.147

Interface
Name    Role PortID   Prio Cost  Sts Cost Link-type Edge
-----------------------------------------------------
Gi 1/0  Root 128.130  128  20000 FWD 20000 P2P      No
Gi 1/1  Altr 128.131  128  20000 BLK 20000 P2P      No
Gi 1/16 Desg 128.146  128  20000 FWD 20000 P2P      Yes
Gi 1/17 Desg 128.147  128  20000 FWD 20000 P2P      Yes
```

Example

```
Dell#show spanning-tree pvst vlan 2
VLAN 2
Root Identifier has priority 4096, Address 0001.e805.e306
Root Bridge hello time 2, max age 20, forward delay 15
Bridge Identifier has priority 4096, Address 0001.e805.e306
Configured hello time 2, max age 20, forward delay 15
We are the root of VLAN 2
Current root has priority 4096, Address 0001.e805.e306
```

```
Number of topology changes 3, last change occured 00:57:00

Port 130 (GigabitEthernet 1/0) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier
128.130
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.130, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1567, received 3
The port is not in the Edge port mode

Port 131 (GigabitEthernet 1/1) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier
128.131
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.131, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1567, received 0
The port is not in the Edge port mode

Port 146 (GigabitEthernet 1/16) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier
128.146
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.146, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1578, received 0
The port is in the Edge port mode

Port 147 (GigabitEthernet 1/17) is designated Forwarding
Port path cost 20000, Port priority 128, Port Identifier
128.147
Designated root has priority 4096, address 0001.e805.e3:06
Designated bridge has priority 4096, address 0001.e805.e3:06
Designated port id is 128.147, designated path cost 0
Number of transitions to forwarding state 1
BPDU sent 1579, received 0
The port is in the Edge port mode
```

Example (EDS/ LBK)

```
Dell#show spanning-tree pvst vlan 2 interface gigabitethernet
1/0
```

GigabitEthernet 1/0 of VLAN 2 is LBK_INC discarding

```
Edge port:no (default) port guard :none (default)
Link type: point-to-point (auto) bpdu filter:disable (default)
Bpdu guard :disable (default)
Bpdus sent 152, received 27562

Interface Designated
Name    PortID   Prio Cost  Sts Cost Bridge ID       PortID
-----------------------------------------------------------
Gi 1/0  128.1223 128  20000 EDS 0 32768 0001.e800.a12b 128.1223
```

Example (EDS/ PVID)

```
Dell#show spanning-tree pvst vlan 2 interface gigabitethernet
1/0
```

GigabitEthernet 1/0 of VLAN 2 is PVID_INC discarding

```
Edge port:no (default) port guard :none (default)
Link type: point-to-point (auto) bpdu filter:disable (default)
Bpdu guard :disable (default)
Bpdus sent 1, received 0

Interface Designated
Name   PortID   Prio Cost  Sts Cost Bridge ID       PortID
---------------------------------------------------------
Gi 1/0 128.1223 128 20000 EDS 0 32768 0001.e800.a12b 128.1223
```

Example (Guard)

```
Dell#show spanning-tree pvst vlan 5 guard
Interface
Name   Instance Sts        Guard type
-----------------------------------
Gi 0/1 5       INCON(Root) Rootguard
Gi 0/2 5       FWD         Loopguard
Gi 0/3 5       EDS(Shut)   Bpduguard
```

Related Commands

spanning-tree pvst — configure PVST+ on an interface.

spanning-tree pvst

Configure a PVST+ interface with one of these settings: edge port with optional bridge port data unit (BPDU) guard, port disablement if an error condition occurs, port priority or cost for a VLAN range, loop guard, or root guard.

S6000

Syntax

`spanning-tree pvst {edge-port [bpduguard [shutdown-on-violation]] | err-disable | vlan *vlan-range* {cost *number* | priority *value*} | loopguard | rootguard}`

Parameters

edge-port	Enter the keywords `edge-port` to configure the interface as a PVST+ edge port.
bpduguard	Enter the keyword `portfast` to enable Portfast to move the interface into Forwarding mode immediately after the root fails. Enter the keyword `bpduguard` to disable the port when it receives a BPDU.
shutdown-on-violation	(OPTIONAL) Enter the keywords `shutdown-on-violation` to hardware disable an interface when a BPDU is received and the port is disabled.
err-disable	Enter the keywords `err-disable` to enable the port to be put into the error-disable state (EDS) if an error condition occurs.

vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
cost *number*	Enter the keyword `cost` then the port cost value. The range is from 1 to 200000. Defaults: • 100 Mb/s Ethernet interface = **200000**. • 1-Gigabit Ethernet interface = **20000**. • 10-Gigabit Ethernet interface = **2000**. • Port Channel interface with one 100 Mb/s Ethernet = **200000**. • Port Channel interface with one 1 Gigabit Ethernet = **20000**. • Port Channel interface with one 10 Gigabit Ethernet = **2000**. • Port Channel with two 1 Gigabit Ethernet = **18000**. • Port Channel with two 10 Gigabit Ethernet = **1800**. • Port Channel with two 100 Mbps Ethernet = **180000**.
priority *value*	Enter the keyword `priority` then the Port priority value in increments of 16. The range is from 0 to 240. The default is **128**.
loopguard	(C-, S-, and E-Series TeraScale only) Enter the keyword `loopguard` to enable loop guard on a PVST+ port or port-channel interface.
rootguard	(C-, S-, and E-Series TeraScale only) Enter the keyword `rootguard` to enable root guard on a PVST+ port or port-channel interface.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.1	Introduced the `loopguard` and `rootguard` options on the E-Series TeraScale, C-Series, and S-Series.
Version 8.3.7.0	Introduced on the S4810.

Version 8.2.1.0	Introduced the hardware `shutdown-on-violation` option.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added the optional Bridge Port Data Unit (BPDU) guard.
Version 6.2.1.1	Introduced.

Usage Information

The BPDU guard option prevents the port from participating in an active STP topology in case a BPDU appears on a port unintentionally, or is misconfigured, or is subject to a DOS attack. This option places the port into the Error Disable state if a BPDU appears, and a message is logged so that the administrator can take corrective action.

NOTE: A port configured as an edge port, on a PVST switch, immediately transitions to the forwarding state. Only ports connected to end-hosts should be configured as an edge port. Consider an edge port similar to a port with a spanning-tree portfast enabled.

If you do not enable `shutdown-on-violation`, BPDUs are still sent to the route process module (RPM) CPU.

You cannot enable `root guard` and `loop guard` at the same time on a port. For example, if you configure `loop guard` on a port on which `root guard` is already configured, the following error message is displayed: `% Error: RootGuard is configured. Cannot configure LoopGuard`.

When used in a PVST+ network, loop guard is performed per-port or per-port channel at a VLAN level. If no BPDUs are received on a VLAN interface, the port or port-channel transitions to a Loop-Inconsistent (blocking) state only for this VLAN.

Enabling Portfast BPDU guard and loop guard at the same time on a port results in a port that remains in a Blocking state and prevents traffic from flowing through it. For example, when Portfast BPDU guard and loop guard are both configured:

- If a BPDU is received from a remote device, BPDU guard places the port in an Err-Disabled Blocking state and no traffic is forwarded on the port.
- If no BPDU is received from a remote device, loop guard places the port in a Loop-Inconsistent Blocking state and no traffic is forwarded on the port.

Example

```
Dell(conf-if-gi-1/1)#spanning-tree pvst vlan 3 cost 18000
Dell(conf-if-gi-1/1)#end
Dell(conf-if-gi-1/1)#show config
!
interface GigabitEthernet 1/1
  no ip address
  switchport
  spanning-tree pvst vlan 3 cost 18000
  no shutdown
Dell(conf-if-gi-1/1)#end

Dell#
```

Related Commands	show spanning-tree pvst — views the PVST+ configuration.

spanning-tree pvst err-disable

Place ports in an Err-Disabled state if they receive a PVST+ BPDU when they are members an untagged VLAN.

S6000

Syntax

`spanning-tree pvst err-disable cause invalid-pvst-bpdu`

Defaults

Enabled; ports are placed in the Err-Disabled state if they receive a PVST+ BPDU when they are members of an untagged VLAN.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced.

Usage Information

Some non-Dell Networking systems which have hybrid ports participating in PVST+ transmit two kinds of BPDUs: an 802.1D BPDU and an untagged PVST+ BPDU.

Dell Networking systems do not expect PVST+ BPDU on an untagged port. If this happens, Dell Networking OS places the port in the Error-Disable state. This behavior might result in the network not converging. To prevent Dell Networking OS from executing this action, use the `no spanning-tree pvst err-disable` command cause `invalid-pvst-bpdu`.

Related Commands

show spanning-tree pvst — views the PVST+ configuration.

tc-flush-standard

Enable the MAC address flushing after receiving every topology change notification.

S6000

Syntax	`tc-flush-standard` To disable, use the `no tc-flush-standard` command.
Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced.

Usage Information	By default, Dell Networking OS implements an optimized flush mechanism for PVST+. This implementation helps in flushing the MAC addresses only when necessary (and less often) allowing for faster convergence during topology changes. However, if a standards-based flush mechanism is needed, you can turn this *knob* command on to enable flushing MAC addresses after receiving every topology change notification.

vlan bridge-priority

Set the PVST+ bridge-priority for a VLAN or a set of VLANs.

S6000

Syntax	`vlan` *`vlan-range`* `bridge-priority` *`value`* To return to the default value, use the `no vlan bridge-priority` command.

Parameters

vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
bridge-priority *value*	Enter the keywords `bridge-priority` then the bridge priority value in increments of 4096. The range is from 0 to 61440. The default is **32768**.

Defaults **32768**

Command Modes CONFIGURATION (conf-pvst)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced.

Related Commands

vlan forward-delay — changes the time interval before Dell Networking OS transitions to the Forwarding state.

vlan hello-time — change the time interval between BPDUs.

vlan max-age — changes the time interval before PVST+ refreshes.

show spanning-tree pvst — displays the PVST+ configuration.

vlan forward-delay

Set the amount of time the interface waits in the Listening state and the Learning state before transitioning to the Forwarding state.

S6000

Syntax

```
vlan vlan-range forward-delay seconds
```

To return to the default setting, use the `no vlan forward-delay` command.

Parameters		
	vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
	forward-delay *seconds*	Enter the keywords `forward-delay` then the time interval, in seconds, that Dell Networking OS waits before transitioning PVST+ to the forwarding state. The range is from 4 to 30 seconds. The default is **15 seconds**.

Defaults **15 seconds**

Command Modes CONFIGURATION (conf-pvst)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced.

Related Commands

vlan bridge-priority — sets the bridge-priority value.

vlan hello-time — changes the time interval between BPDUs.

vlan max-age — changes the time interval before PVST+ refreshes.

show spanning-tree pvst — displays the PVST+ configuration.

vlan hello-time

Set the time interval between generation of PVST+ 7 BPDUs.

S6000

Syntax `vlan` *`vlan-range`* `hello-time` *`seconds`*

To return to the default value, use the `no vlan hello-time` command.

Parameters		
	vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
	hello-time *seconds*	Enter the keywords `hello-time` then the time interval, in seconds, between transmission of BPDUs. The range is from 1 to 10 seconds. The default is **2 seconds**.

Defaults **2 seconds**

Command Modes CONFIGURATION (conf-pvst)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced.

Related Commands

vlan bridge-priority — sets the bridge-priority value.

vlan forward-delay — changes the time interval before Dell Networking OS transitions to the forwarding state.

vlan max-age — changes the time interval before PVST+ refreshes.

show spanning-tree pvst — displays the PVST+ configuration.

vlan max-age

To maintain configuration information before refreshing that information, set the time interval for the PVST+ bridge.

S6000

Syntax `vlan vlan-range max-age seconds`

To return to the default, use the `no vlan max-age` command.

Parameters

vlan *vlan-range*	Enter the keyword `vlan` then the VLAN numbers. The range is from 1 to 4094.
max-age *seconds*	Enter the keywords `max-age` then the time interval, in seconds, that Dell Networking OS waits before refreshing configuration information. The range is from 6 to 40 seconds. The default is **20 seconds**.

Defaults

20 seconds

Command Modes

CONFIGURATION (conf-pvst)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced.

Related Commands

vlan bridge-priority — sets the bridge-priority value.

vlan forward-delay — changes the time interval before Dell Networking OS transitions to the forwarding state.

vlan hello-time — changes the time interval between BPDUs.

show spanning-tree pvst — displays the PVST+ configuration.

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Quality of Service (QoS)

The Dell Networking operating software commands for quality of service (QoS) include traffic conditioning and congestion control. QoS commands are not universally supported on all Dell Networking Products.S6000 platform.

This chapter contains the following sections:

- Global Configuration Commands
- Per-Port QoS Commands
- Policy-Based QoS Commands

Global Configuration Commands

There is only one global configuration QoS command.

qos-rate-adjust

By default, while rate limiting, policing, and shaping, Dell Networking OS does not include the Preamble, SFD, or the IFG fields. These fields are overhead; only the fields from MAC destination address to the CRC are used for forwarding and are included in these rate metering calculations. You can optionally include overhead fields in rate metering calculations by enabling QoS Rate Adjustment.

S6000

Syntax

```
qos-rate-adjustment overhead-bytes
```

Parameters

overhead-bytes	Include a specified number of bytes of packet overhead to include in rate limiting, policing, and shaping calculations. The range is from 1 to 31.

Defaults

QoS rate adjustment is disabled by default.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced.

service-class bandwidth-percentage

Specify a minimum bandwidth for queues.

S6000

Syntax

```
service-class bandwidth-percentage queue0 number queue1 number
queue2 number queue3 number queue4 number queue5 number queue6
number queue7 number
```

```
service-class bandwidth-percentage queue0 number queue1 number
queue2 number queue3 number
```

Parameters

number	Enter the bandwidth-weight, as a percentage. The range is from 1 to 100.
number	Enter the bandwidth-weight, as a percentage.

Defaults none

Command Modes CONFIGURATION

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.1	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

Usage Information

Guarantee a minimum bandwidth to different queues globally using the `service-class bandwidth-percentage` command from CONFIGURATION mode. The command is applied in the same way as the `bandwidth-percentage` command in an output QoS policy. The `bandwidth-percentage` command in QOS-POLICY-OUT mode supersedes the `service-class bandwidth-percentage` command.

service-class dot1p-mapping

Configure a service-class criterion based on a dot1p value.

S6000

Syntax

```
service-class dot1p-mapping {dot1p0 queue | dot1p1 queue |
dot1p2 queue | dot1p3 queue | dot1p4 queue| dot1p5 queue |
dot1p6 queue | dot1p7 queue}
```

Parameters

queue	Enter a value from 0 to 7.

Defaults

For each dot1p Priority, the default CoS queue value is:

- Dot1p Priority : 0 1 2 3 4 5 6 7
- Queue : 2 0 1 3 4 5 6 7

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

To apply dot1p-queue-mapping, use the `service-class dynamic dot1p` command.

Related Commands

show qos dot1p-queue-mapping — displays the dot1p priority to queue mapping on the switch.

show qos dot1p-queue-mapping

Displays the dot1p priority to queue mapping on the switch.

S6000

Syntax

```
show qos dot1p-queue-mapping
```

Defaults

- dot1p Priority: 0 1 2 3 4 5 6 7
- Queue: 2 0 1 3 4 5 6 7

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Related Commands	service-class dot1p-mapping — Identifies the class map.

strict-priority queue

Configure a unicast queue as a strict-priority (SP) queue.

S6000

Syntax	`strict-priority queue unicast` *`number`*
Parameters	

unicast *number*	Enter the keyword `unicast` then the queue number. The range is from 1 to 7.

Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	After you configure a unicast queue as strict-priority, that particular queue, on the entire chassis, is treated as a `strict-priority queue`. Traffic for a strict priority is scheduled before any other queues are serviced. For example, if you send 100% line rate traffic over the SP queue, it starves all other queues on the ports on which this traffic is flowing.

Per-Port QoS Commands

Per-port QoS (port-based QoS) allows you to define the QoS configuration on a per-physical-port basis.

dot1p-priority

Assign a value to the IEEE 802.1p bits on the traffic this interface receives.

S6000

Syntax

`dot1p-priority *priority-value*`

To delete the IEEE 802.1p configuration on the interface, use the `no dot1p-priority` command.

Parameters

priority-value Enter a value from 0 to 7.

dot1p	Queue Number
0	2
1	0
2	1
3	3
4	4
5	5
6	6
7	7

Defaults	none
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

The `dot1p-priority` command changes the priority of incoming traffic on the interface. The system places traffic marked with a priority in the correct queue and processes that traffic according to its queue.

When you set the priority for a port channel, the physical interfaces assigned to the port channel are configured with the same value. You cannot assign the `dot1p-priority` command to individual interfaces in a port channel.

rate police

Police the incoming traffic rate on the selected interface.

S6000

Syntax

```
rate police [kbps] committed-rate [burst-KB] [peak [kbps] peak-rate [burst-KB]] [vlan vlan-id]
```

Parameters

kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
committed-rate	Enter the bandwidth in Mbps. The range is from 0 to 40000.
burst-KB	(OPTIONAL) Enter the burst size in KB. The range is from 16 to 200000. The default is **50**.
peak *peak-rate*	(OPTIONAL) Enter the keyword `peak` then a number to specify the peak rate in Mbps. The range is from 0 to 40000.
vlan *vlan-id*	(OPTIONAL) Enter the keyword `vlan` then a VLAN ID to police traffic to those specific VLANs. The range is from 1 to 4094.

Defaults

Granularity for `commited-rate` and `peak-rate` is Mbps unless you use the `kbps` option.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added the `kbps` option on the C-Series, E-Series, and S-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

NOTE: Per Port rate shape and rate police is supported for Layer 2 tagged and untagged switched traffic and for Layer 3 traffic. Per VLAN rate shape and rate police is supported on only tagged ports with Layer 2 switched traffic.

S-Series

On one interface, you can configure the `rate police` command for a VLAN or you can configure the `rate police` command for an interface. For each physical interface, you can configure three `rate police` commands specifying different VLANS.

rate shape

Shape the traffic output on the selected interface.

S6000

Syntax `rate shape [kbps] *rate* [*burst-KB*]`

Parameters

kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
rate	The range is from 10 to 40000.
burst-KB	(OPTIONAL) Enter the burst size in KB. The range is from 0 to 10000. The default is **50**.

Defaults Granularity for rate is **Mbps** unless you use the `kbps` option.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Added the `kbps` option on the C-Series, E-Series, and S-Series.
Version 7.6.1.0	Introduced on the S-Series and C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

On 40-port 10G stack-unit if the traffic is shaped between 64 and 1000 Kbs, for some values, the shaped rate is much less than the value configured

NOTE: When packets of size greater than 7000 bytes are expected to be received from the network, Dell Networking recommends that you configure the burst value to be more than 175 KB if you configured the rate shape. Such a setting ensures proper bandwidth sharing across queues.

Related Commands

rate-shape — shapes traffic output as part of the designated policy.

service-class dynamic dot1p

Honor all 802.1p markings on incoming switched traffic on an interface (from INTERFACE mode) or on all interfaces (from CONFIGURATION mode). A CONFIGURATION mode entry supersedes an INTERFACE mode entry.

S6000

Syntax

`service-class dynamic dot1p`

To return to the default setting, use the `no service-class dynamic dot1p` command.

Defaults

All dot1p traffic is mapped to Queue 0 unless you enable the `service-class dynamic dot1p` command. The default mapping is as follows:

dot1p	Queue ID
0	2
1	0
2	1
3	3
4	4
5	5
6	6
7	7

Command Modes

- INTERFACE
- CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

To honor all incoming 802.1p markings on incoming switched traffic on the interface, enter this command. By default, this facility is not enabled (that is, the 802.1p markings on incoming traffic are not honored).

You can apply this command on both physical interfaces and port channels. When you set the service-class dynamic for a port channel, the physical interfaces assigned to the port channel are automatically configured; you cannot assign the `service-class dynamic` command to individual interfaces in a port channel.

- All dot1p traffic is mapped to Queue 0 unless you enable the `service-class dynamic dot1p` command on an interface or globally.
- Layer 2 or Layer 3 service policies supersede dot1p service classes.

Policy-Based QoS Commands

Policy-based traffic classification is handled with class maps. These maps classify unicast traffic into one of eight classes in S-Series or eight classes in case of S6000. Dell Networking OS enables you to match multiple class maps and specify multiple match criteria. Policy-based QoS is not supported on logical interfaces, such as port-channels, VLANS, or loopbacks.

bandwidth-percentage

Assign a percentage of weight to the class/queue.

S6000

Syntax

`bandwidth-percentage percentage`

To remove the bandwidth percentage, use the `no bandwidth-percentage` command.

Parameters

percentage	Enter the percentage assignment of bandwidth to the class/queue. The range is from 1 to 100% (granularity 1%).

Defaults

none

Command Modes

CONFIGURATION (conf-qos-policy-out)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.1.9.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The unit of bandwidth percentage is 1%. If the sum of the bandwidth percentages given to all eight classes exceeds 100%, the bandwidth percentage automatically scales down to 100%.

Related Commands

qos-policy-output — creates a QoS output policy.

buffer-stats-snapshot

Enable the buffer statistics tracking utility and enter the Buffer Statistics Snapshot configuration mode. You must enable this utility to be able to configure the parameters for buffer statistics tracking. This utility is supported on the S6000 platform.

S6000

Syntax	`[No] buffer-stats-snapshot` To disable the buffer statistics tracking utility, enter the `disable` command from the BUFFER-STATS-SNAPSHOT mode.
Default	By default, buffer statistics tracking is disabled.
Command Modes	CONFIGURATION mode
Command History	**Version 9.3.0.0** Introduced on the S6000 platform
Usage Information	Only the software-based trigger for retrieving and calculating the snapshots of the statistical counters of the buffer space is supported. Collection of snapshots of buffer statistical counters based on hardware threshold settings is not supported, which can be used to specify the type of hardware threshold and the threshold profile templates.

Example

```
Dell(conf)#buffer-stats-snapshot
Dell(conf-buffer-stats-snapshot)#?
disable                 Disable buffer-stats-snapshot globally
end                     Exit from configuration mode
exit                    Exit from buffer-stats-snapshot
configuration mode
no                      Negate a command or set its defaults
show                    Show buffer-stats-snapshot
configuration
Dell(conf-buffer-stats-snapshot)#no disable
Dell(conf-buffer-stats-snapshot)#show configuration
!
buffer-stats-snapshot
 no disable
```

class-map

Create/access a class map. Class maps differentiate traffic so that you can apply separate quality-of-service policies to each class.

S6000

Syntax

`class-map {match-all | match-any} *class-map-name* [cpu-qos] [layer2]`

Parameters

match-all	Determines how packets are evaluated when multiple match criteria exist. Enter the keywords `match-all` to determine that the packets must meet all the match criteria in order to be a member of the class.
match-any	Determines how packets are evaluated when multiple match criteria exist. Enter the keywords `match-any` to determine that the packets must meet at least one of the match criteria in order to be a member of the class.

class-map-name	Enter a name of the class for the class map in a character format (32 character maximum).
cpu-qos	Enter the keyword `cpu-qos` to assign this Class Map to control plane traffic only (CoPP).
layer2	Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.

Defaults

Layer 3

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Class-map names can be 32 characters. Layer2 available on the C-Series and S-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	E-Series Only: Expanded to add support for Layer 2.

Usage Information

Packets arriving at the input interface are checked against the match criteria and configured using this command to determine if the packet belongs to that class. This command accesses CLASS-MAP mode, where the configuration commands include the`match ip` and `match mac` options.

Related Commands

ip access-list extended — configures an extended IP ACL.

ip access-list standard — configures a standard IP ACL.

match ip access-group — configures the match criteria based on the access control list (ACL).

match ip precedence — identifies the IP precedence values as match criteria.

match ip dscp — configures the match criteria based on the DSCP value.

match mac access-group — configures a match criterion for a class map based on the contents of the designated MAC ACL.

match mac dot1p — configures a match criterion for a class map based on a dot1p value.

match mac vlan — configures a match criterion for a class map based on VLAN ID.

service-queue — assigns a class map and QoS policy to different queues.

show qos class-map — views the current class map information.

clear qos statistics

Clear qos statistics clears statistics from show qos statistics.

S6000

Syntax	`clear qos statistics interface-name`
Parameters	*interface-name* — Enter one of the following keywords: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
Defaults	none
Command Modes	• EXEC • EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.18.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

show qos statistics — displays the QoS statistics.

description

Add a description to the selected policy map or QoS policy.

S6000

Syntax	`description {description}` To remove the description, use the `no description {description}` command.
Parameters	*description* — Enter a description to identify the policies (80 characters maximum).
Defaults	none
Command Modes	CONFIGURATION (policy-map-input and policy-map-output; conf-qos-policy-in and conf-qos-policy-out; wred)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
pre-Version 7.7.1.0	Introduced.

Related Commands

policy-map-input — creates an input policy map.

policy-map-output — creates an output policy map.

qos-policy-input — creates an input QoS-policy on the router.

qos-policy-output — creates an output QoS-policy on the router.

wred-profile — creates a WRED profile.

match ip access-group

Configure match criteria for a class map, based on the access control list (ACL).

NOTE: IPv6 class-maps and IP-any class-maps do not match. This condition is true for IPv6 and IP-any class-maps on both ACLs as well as VLANs.

S6000

Syntax	`match ip access-group` *`access-group-name`* `[set-ip-dscp` *`value`* `|` `set-color` *`value`*`]` To remove ACL match criteria from a class map, use the `no match ip access-group access-group-name [set-ip-dscp` *`value`* `| set-color` *`value`*`]` command.

Parameters

access-group-name	Enter the ACL name whose contents are used as the match criteria in determining if packets belong to the class the class-map specifies.
set-ip-dscp *value*	(OPTIONAL) Enter the keywords `set-ip-dscp` then the IP DSCP value. The matched traffic is marked with the DSCP value. The range is from 0 to 63.
set-color *value*	(Optional) Enter the keyword set-color followed by a color value. Traffic that fulfills the match criteria is marked with the color value that you specify. The default value is Yellow.

Defaults — none

Command Modes — CLASS-MAP CONFIGURATION (config-class-map)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria. For class-map match-any, a maximum of five ACL match criteria are allowed. For `class-map match-all`, only one ACL match criteria is allowed.

Related Commands

class-map — identifies the class map.

match ip dscp

Use a differentiated services code point (DSCP) value as a match criteria.

S6000

Syntax	`match {ip	ipv6	ip-any} dscp` *`dscp-list`* `[set-ip-dscp` *`value`*`]` To remove a DSCP value as a match criteria, use the `no match {ip	ipv6	ip-any} dscp` *`dscp-list`* `[[multicast] set-ip-dscp` *`value`*`]` command.

Parameters

ip	Enter the keyword `ip` to support IPv4 traffic.
ipv6	Enter the keyword `ipv6` to support IPv6 traffic.
ip-any	Enter the keyword `ip-any` to support IPv4 and IPv6 traffic.
dscp-list	Enter the IP DSCP values that is to be the match criteria. Separate values by commas — no spaces (1,2,3) or indicate a list of values separated by a hyphen (1-3). The range is from 0 to 63.
set-ip-dscp *value*	(OPTIONAL) Enter the keywords `set-ip-dscp` then the IP DSCP value. The matched traffic is marked with the DSCP value. The range is from 0 to 63.

Defaults	none
Command Modes	CLASS-MAP CONFIGURATION (config-class-map)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added the **ipv6** and **ip-any** options on the Z9000, S6000, S4820T, S4810, MXL.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.

The `match ip dscp` and `match ip precedence` commands are mutually exclusive.

Up to 64 IP DSCP values can be matched in one match statement. For example, to indicate IP DCSP values 0 1 2 3 4 5 6 7, enter either the `match ip dscp 0,1,2,3,4,5,6,7` or `match ip dscp 0-7` command.

NOTE: Only one of the IP DSCP values must be a successful match criterion, not all of the specified IP DSCP values must match.

Related Commands

class-map — identifies the class map.

match ip precedence

Use IP precedence values as a match criteria.

S6000

Syntax

```
match {ip | ipv6 | ip-any} precedence ip-precedence-list [set-ip-dscp value]
```

To remove IP precedence as a match criteria, use the `no match {ip | ipv6 | ip-any} precedence ip-precedence-list [[multicast] set-ip-dscp value]` command.

Parameters

ip	Enter the keyword `ip` to support IPv4 traffic.
ipv6	Enter the keyword `ipv6` to support IPv6 traffic.
ip-any	Enter the keyword `ip-any` to support IPv4 and IPv6 traffic.
ip-precedence-list	Enter the IP precedence value(s) as the match criteria. Separate values by commas — no spaces (1,2,3) or indicate a list of values separated by a hyphen (1-3). The range is from 0 to 7.
set-ip-dscp *value*	(OPTIONAL) Enter the keywords `set-ip-dscp` then the IP DSCP value. The matched traffic is marked with the DSCP value. The range is from 0 to 63.

Defaults

none

Command Modes

CLASS-MAP CONFIGURATION (config-class-map)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for the ipv6 and ip-any options on the Z9000, S6000, S4820T, S4810, MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.

The `match ip precedence` command and the `match ip dscp` command are mutually exclusive.

Up to eight precedence values can be matched in one match statement. For example, to indicate the IP precedence values 0 1 2 3, enter either the `match ip precedence 0-3` or `match ip precedence 0,1,2,3` command.

NOTE: Only one of the IP precedence values must be a successful match criterion, not all of the specified IP precedence values must match.

Related Commands

class-map — identifies the class map.

match mac access-group

Configure a match criterion for a class map, based on the contents of the designated MAC ACL.

S6000

Syntax

`match mac access-group {mac-acl-name}`

Parameters

mac-acl-name	Enter a MAC ACL name. Its contents is used as the match criteria in the class map.

Defaults

none

Command Modes

CLASS-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Available on the C-Series and S-Series.

Version 7.5.1.0	Added support for the `DSCP Marking` option.
pre-Version 7.4.1.0	Introduced.

Usage Information	To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.
Related Commands	class-map — identifies the class map.

match mac dot1p

Configure a match criterion for a class map based on a dot1p value.

S6000

Syntax

```
match mac dot1p {dot1p-list}
```

Parameters

dot1p-list	Enter a dot1p value. The range is from 0 to 7.

Defaults	none
Command Modes	CLASS-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Available on the C-Series and S-Series.
Version 7.5.1.0	Added support for the `DSCP Marking` option.
pre-Version 7.4.1.0	Introduced.

Usage Information	To access this command, enter the `class-map` command. After the class map is identified, you can configure the match criteria.
Related Commands	class-map — identifies the class map.

match mac vlan

Configure a match criterion for a class map based on VLAN ID.

S6000

Syntax	`match mac vlan` *`number`*
Parameters	*number* — Enter the VLAN ID. The range is from 1 to 4094.
Defaults	none
Command Modes	CLASS-MAP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version	Description
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced.

Usage Information	To access this command, enter the `class-map` command. You can match against only one VLAN ID.
Related Commands	class-map — identifies the class map.

policy-aggregate

Allow an aggregate method of configuring per-port QoS via policy maps. An aggregate QoS policy is part of the policy map (output) applied on an interface.

S6000

Syntax	`policy-aggregate` *`qos-policy-name`* To remove a policy aggregate configuration, use the `no policy-aggregate` *`qos-policy-name`* command.
Parameters	*qos-policy-name* — Enter the name of the policy map in character format (32 characters maximum).

Defaults	none
Command Modes	CONFIGURATION (policy-map-input and policy-map-output) This command is supported on S-Series, S6000 and S4810 under policy-map-input mode only.
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Policy name character limit increased from 16 to 32.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Related Commands

policy-map-input — creates an input policy map.

policy-map-output — creates an output policy map (E-Series Only).

policy-map-input

Create an input policy map.

S6000

Syntax

`policy-map-input` *`policy-map-name`* `cpu-qos | [layer2]`

To remove an input policy map, use the `no policy-map-input` *`policy-map-name`* `cpu-qos | [layer2]` command.

Parameters

policy-map-name	Enter the name of the `policy map` in character format (32 characters maximum).
cpu-qos	Enter the `cpu-qos` keyword to assign this ACL to control plane traffic only.
layer2	(OPTIONAL) Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.

Defaults	**Layer 3**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

The input policy map is used to classify incoming traffic to different flows using class-map, QoS policy, or incoming packets DSCP. This command enables Policy-Map-Input Configuration mode (conf-policy-map-in).

When changing a "service-queue" configuration in a QoS policy map, all QoS rules are deleted and re-added automatically to ensure that the order of the rules is maintained. As a result, the Matched Packets value shown in the "`show qos statistics`" command is reset.

Related Commands

service-queue — assigns a class map and QoS policy to different queues.

policy-aggregate — allows an aggregate method of configuring per-port QoS using policy maps.

service-policy input — applies an input policy map to the selected interface.

policy-map-output

Create an output policy map.

S6000

Syntax

`policy-map-output policy-map-name`

To remove a policy map, use the `no policy-map-output policy-map-name` command.

Parameters

policy-map-name	Enter the name for the policy map in character format (32 characters maximum).

Defaults

none

Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Policy name character limit increased from 16 to 32.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

To assign traffic to different flows using QoS policy, use the Output Policy map. This command enables Policy-Map-Output Configuration mode (conf-policy-map-out).

Related Commands

service-queue — assigns a class map and QoS policy to different queues.

policy-aggregate — allows an aggregate method of configuring per-port QoS using policy maps.

service-policy output — applies an output policy map to the selected interface.

qos-policy-input

Create a QoS input policy on the router.

S6000

Syntax

`qos-policy-input` *`qos-policy-name`* `cpu-qos | layer2`

To remove an existing input QoS policy from the router, use the `no qos-policy-input` *`qos-policy-name`* `cpu-qos | layer2` command.

Parameters

qos-policy-name	Enter the name for the policy map in character format (32 characters maximum).
cpu-qos	(OPTIONAL) Enter the keyword `cpu-qos` keyword to assign this ACL to control plane traffic only.
layer2	(OPTIONAL) Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.

Defaults	**Layer 3**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

Use this command to specify the name of the input QoS policy. Once input policy is specified, rate-police can be defined. This command enables the qos-policy-input configuration mode— (conf-qos-policy-in).

When changing a Service-Queue configuration in a QoS policy map, all QoS rules are deleted and re-added automatically to ensure that the order of the rules is maintained. As a result, the Matched Packets value shown in the `show qos statistics` command is reset.

Related Commands

rate police — incoming traffic policing function.

qos-policy-output

Create a QoS output policy.

S6000

Syntax

`qos-policy-output qos-policy-name`

To remove an existing output QoS policy, use the `no qos-policy-output qos-policy-name` command.

Parameters

qos-policy-name	Enter your output QoS policy name in character format (32 characters maximum).

Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Policy name character limit increased from 16 to 32.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information

Use this command to specify the name of the output QoS policy. Once output policy is specified, rate-shape, scheduler strict, bandwidth-percentage, and WRED can be defined. This command enables the qos-policy-output configuration mode —(conf-qos-policy-out).

When rate-shape in QoS policy is applied both on queue level and aggregate mode, the queue-based shaping occurs first followed by the aggregate rate shaping.

Related Commands

bandwidth-percentage — assigns weight to the class/queue.

wred — assigns yellow or green drop precedence.

rate-police

Specify the policing functionality on incoming traffic.

S6000

Syntax

`rate-police [kbps] committed-rate [burst-KB] [peak [kbps] peak-rate [burst-KB]]`

Parameters

kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). Make the following value a multiple of 64. The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
committed-rate	Enter the bandwidth in Mbps. The range is from 0 to 40000.
burst-KB	(OPTIONAL) Enter the burst size in KB. The range is from 16 to 200000. The default is **100**.
peak *peak-rate*	(OPTIONAL) Enter the keyword `peak` then a number to specify the peak rate in Mbps. The range is from 0 to 40000. The default is the same as designated for `committed-rate`.

Defaults

Burst size is 100KB. `peak-rate` is by default the same as `committed-rate`. Granularity for `committed-rate` and `peak-rate` is Mbps unless you use the `kbps` option.

Command Modes

QOS-POLICY-IN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

The default burst size is 100Kb. If a different value is required, you must configure the burst size to the required value.

Related Commands

rate police — specifies traffic policing on the selected interface.

qos-policy-input — creates a QoS output policy.

rate-shape

Shape traffic output as part of the designated policy.

S6000

Syntax

```
rate-shape [kbps] rate [burst-KB]
```

Parameters

kbps	Enter the keyword `kbps` to specify the rate limit in Kilobits per second (Kbps). Make the following value a multiple of 64. The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
rate	The range is from 10 to 40000.
burst-KB	(OPTIONAL) Enter the burst size in KB. The range is from 0 to 40000. The default is **100**.

Defaults

Burst size is 10KB. Granularity for rate is Mbps unless you use the `kbps` option.

Command Modes

QOS-POLICY-OUT

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Related Commands

rate shape — shapes traffic output as part of the designated policy.

qos-policy-output — creates a QoS output policy.

service-policy input

Apply an input policy map to the selected interface.

S6000

Syntax

`service-policy input policy-map-name [layer2]`

To remove the input policy map from the interface, use the `no service-policy input policy-map-name [layer2]` command.

Parameters

policy-map-name	Enter the name for the policy map in character format (32 characters maximum). You can identify an existing policy map or name one that does not yet exist.
layer2	(OPTIONAL) Enter the keyword `layer2` to specify a Layer 2 Class Map. The default is **Layer 3**.

Defaults

Layer 3

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information	You can attach a single policy-map to one or more interfaces to specify the service-policy for those interfaces. A policy map attached to an interface can be modified.

NOTE: The `service-policy` commands are not allowed on a port channel. The `service-policy input policy-map-name` command and the `service-class dynamic dot1p` command are not allowed simultaneously on an interface.

Related Commands	policy-map-input — creates an input policy map.

service-policy output

Apply an output policy map to the selected interface.

S6000

Syntax

```
service-policy output policy-map-name
```

To remove the output policy map from the interface, use the `no service-policy output policy-map-name` command.

Parameters

policy-map-name	Enter the name for the policy map in character format (32 characters maximum). You can identify an existing policy map or name one that does not yet exist.

Defaults	none
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information	A single policy-map can be attached to one or more interfaces to specify the service-policy for those interfaces. A policy map attached to an interface can be modified.
Related Commands	policy-map-output — creates an output policy map.

service-queue

Assign a class map and QoS policy to different queues.

S6000

Syntax

`service-queue queue-id [class-map class-map-name] [qos-policy qos-policy-name]`

To remove the queue assignment, use the `no service-queue queue-id [class-map class-map-name] [qos-policy qos-policy-name]` command.

Parameters

queue-id	Enter the value used to identify a queue. The range is from 0 to 7.
class-map *class-map-name*	(OPTIONAL) Enter the keyword `class-map` then the class map name assigned to the queue in character format (16 character maximum). **NOTE:** This option is available under `policy-map-input` only.
qos-policy *qos-policy-name*	(OPTIONAL) Enter the keywords `qos-policy` then the QoS policy name assigned to the queue in text format (16 characters maximum). This specifies the input QoS policy assigned to the queue under `policy-map-input` and output QoS policy under `policy-map-output` context.

Defaults

none

Command Modes

CONFIGURATION (conf-policy-map-in and conf-policy-map-out)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	There are eight queues per interface on the S6000 and four queues on the S-Series. This command assigns a class map or QoS policy to different queues.
Related Commands	class-map — identifies the class map. service-policy input — applies an input policy map to the selected interface. service-policy output — applies an output policy map to the selected interface.

set

Mark outgoing traffic with a differentiated service code point (DSCP) or dot1p value.

S6000

Syntax

```
set {ip-dscp value | mac-dot1p value}
```

Parameters

ip-dscp *value*	(OPTIONAL) Enter the keywords `ip-dscp` then the IP DSCP value. The range is from 0 to 63.
mac-dot1p *value*	Enter the keywords `mac-dot1p` then the dot1p value. The range is from 0 to 7.

Defaults	none
Command Modes	CONFIGURATION (conf-qos-policy-in)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information	After the IP DSCP bit is set, other QoS services can then operate on the bit settings.

show qos class-map

View the current class map information.

S6000

Syntax

```
show qos class-map [class-name]
```

Parameters

class-name	(Optional) Enter the name of a configured class map.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Example

```
Dell#show qos class-map

Class-map match-any CM
  Match ip access-group ACL
```

Related Commands

class-map — identifies the class map.

show qos policy-map

View the QoS policy map information.

S6000

Syntax

`show qos policy-map {summary [interface] | detail}`

Parameters

summary *interface*	To view a policy map interface summary, enter the keyword `summary` and optionally one of the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
detail *interface*	To view a policy map interface in detail, enter the keyword `detail` and optionally one of the following keywords and slot/port or number information: • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Example (IPv4)

```
Dell#show qos policy-map detail tengigabitethernet 0/0

Interface TeGigabitEthernet 4/1

Policy-map-input policy
Queue# Class-map-name Qos-policy-name
 0 - q0
 1 CM1q1
 2 CM2q2
 3 CM3q3
 4 CM4q4
 5 CM5q5
 6 CM6q6
 7 CM7q7
Dell#
```

Example (IPv6)

```
Dell# show qos policy-map detail Tegigabitethernet 0/0

Interface TeGigabitEthernet 8/29

Policy-map-input pmap1

Queue# Class-map-name Qos-policy-name
 0       c0            q0
 1       c1            q1
 2       c2            q2
 3       c3            q3
 4       c4            q4
 5       c5            -
 6       c6            q6
 7       c7            q7
Dell#
```

Example (Summary IPv4)

```
Dell#sho qos policy-map summary

Interface policy-map-input policy-map-output
Gi 4/1     PM1                 -
Gi 4/2     PM2         PMOut
Dell#
```

show qos policy-map-input

View the input QoS policy map details.

S6000

Syntax

`show qos policy-map-input [policy-map-name] [class class-map-name] [qos-policy-input qos-policy-name]`

Parameters

policy-map-name	Enter the policy map name.
class *class-map-name*	Enter the keyword `class` then the class map name.
qos-policy-input *qos-policy-name*	Enter the keyword `qos-policy-input` then the QoS policy name.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	E-Series Only: Added Trust IPv6 diffserv.
pre-Version 6.1.1.1	Introduced on the E-Series.

Example

```
Dell#show qos policy-map-input

Policy-map-input PolicyMapInput
Aggregate Qos-policy-name AggPolicyIn
Queue# Class-map-name  Qos-policy-name
0      ClassMap1       qosPolicyInput
Dell#
```

show qos policy-map-output

View the output QoS policy map details.

S6000

Syntax

```
show qos policy-map-output [policy-map-name] [qos-policy-output
qos-policy-name]
```

Parameters

policy-map-name	Enter the policy map name.
qos-policy-output *qos-policy-name*	Enter the keyword `qos-policy-output` then the QoS policy name.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Example

```
Dell#show qos policy-map-output

Policy-map-output PolicyMapOutput
Aggregate Qos-policy-name AggPolicyOut
Queue#   Qos-policy-name
```

```
  0      qosPolicyOutput
Dell#
```

show qos qos-policy-input

View the input QoS policy details.

S6000

Syntax `show qos qos-policy-input [qos-policy-name]`

Parameters

qos-policy-name	Enter the QoS policy name.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Example

```
Dell#show qos qos-policy-input

Qos-policy-input QosInput
        Rate-police 100 50 peak 100 50
        Dscp 32
Dell#
```

show qos qos-policy-output

View the output QoS policy details.

S6000

Syntax	`show qos qos-policy-output [qos-policy-name]`
Parameters	*qos-policy-name* — Enter the QoS policy name.
Defaults	none
Command Modes	EXEC EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
pre-Version 6.1.1.1	Introduced on the E-Series.

Example

```
Dell#show qos qos-policy-output

Qos-policy-output qosOut
        Rate-limit 50 50 peak 50 50
        Wred yellow 1
        Wred green 1
```

show qos statistics

View QoS statistics.

S6000

Syntax

```
show qos statistics {wred-profile [interface]} | [interface]
```

Parameters

wred-profile *interface*	Enter the keywords `wred-profile` and optionally one of the following keywords and slot/port or number information: - For a 40–Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. - For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
interface	Enter one of the following keywords and slot/port or number information: - For a 40–Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. - For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

show qos wred-profile

View the WRED profile details.

S6000

Syntax

```
show qos wred-profile wred-profile-name
```

Parameters

wred-profile-name	Enter the WRED profile name to view the profile details.

Defaults

none

Command Modes

- EXEC

- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Example

```
Dell#show qos wred-profile
Wred-profile-name    min-threshold    max-threshold      max-
drop-rate
wred_drop                   0               0
100
wred_teng_y                 238          2378
100
wred_teng_g                 238          2378
50
wred_fortyg_y               238          2378
50
wred_fortyg_g               238          2378
25
ecn                         594          5941
50
Dell#
```

service-class buffer shared-threshold-weight

Create a service class and associate the threshold weight of the shared buffer with each of the queues per port in the egress direction. A global buffer pool that is a shared buffer pool accessed by multiple queues when the minimum guaranteed buffers for the queue are consumed can be configured on the S6000 platform.

S6000

Syntax

```
[No] Service-class buffer shared-threshold-weight {[queue0
number] || [queue1 number] || [queue2 number] || [queue3
number] || [queue4 number] || [queue5 number] || [queue6
number] || [queue7 number]}
```

Parameters

buffer	Define the shared buffer settings
shared-threshold-weight	Specify the weight of a queue for the shared buffer space
queue 0 to queue 7	Specify the queue number to which the WRED parameters apply

number	Enter a weight for the queue on the shared buffer as a number in the range of 1 to 11.

Default

The default threshold weight on the shared buffer for each queue is 9. Therefore, each queue can consume up to 66.67 percent of available shared buffer by default.

Command Modes

INTERFACE mode

Command History

Version 9.3(0.0)	Introduced on the S6000 platform

Usage Information

You can configure all the data queues. For S6000, you can configure queues 0-7.

The following table describes the mapping between the threshold weight of the shared buffer on the queue and the percentage of available shared buffer that is used by the queue for each of the corresponding threshold weights of the shared buffer:

shared-threshold-weight on the queue	% of available shared buffer that can be consumed by the queue.
0	No dynamic sharing; shared buffer = 0.
1	0.77%
2	1.54%
3	3.03%
4	5.88%
5	11.11%
6	20%
7	33.33%
8	50%
9	66.67%
10	80%
11	88.89%

Example

```
Dell(conf-if-te-0/8)#Service-class buffer shared-threshold-
weight queue5 4 queue7 6
```

test cam-usage

Check the Input Policy Map configuration for the CAM usage.

S6000

Syntax	`test cam-usage service-policy input policy-map stack-unit {[number port-set portpipe number] | [all]}`

Parameters

policy-map	Enter the policy map name.
stack-unit*number*	(OPTIONAL) Enter the keyword `stack-unit` then the stack-unit slot number.
port-set *portpipe number*	Enter the keywords `port-set` then the stack-unit port pipe number. The range is from 0 or 1.
stack-unit all	(OPTIONAL) Enter the keywords `stack-unit` all to indicate all stack-unit.

Defaults	none
Command Modes	EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

This feature allows you to determine if the CAM has enough space available before applying the configuration on an interface.

An input policy map with both Trust and Class-map configuration, the Class-map rules are ignored and only the Trust rule is programmed in the CAM. In such an instance, the Estimated CAM output column contains the size of the CAM space required for the Trust rule and not the Class-map rule.

The following describes the `text cam-usage service-policy input policy-map stack-unit` command shown in the following example.

Field	Description
stack-unit	Indicates the stack-unit slot number.
Portpipe	Indicates the portpipe number.
CAM Partition	The CAM space where the rules are added.
Available CAM	Indicates the free CAM space, in the partition, for the classification rules. **NOTE:** The CAM entries reserved for the default rules are not included in the Available CAM column; free entries, from the default rules space, cannot be used as a policy map for the classification rules.
Estimated CAM per Port	Indicates the number of free CAM entries required (for the classification rules) to apply the input policy map on a single interface. **NOTE:** The CAM entries for the default rule are not included in this column; a CAM entry for the default rule is always dedicated to a port and is always available for that interface.
Status (Allowed ports)	Indicates if the input policy map configuration on an interface belonging to a stack-unit/port-pipe is successful — Allowed (n) — or not successful — Exception. The allowed number (n) indicates the number of ports in that port-pipe on which the Policy Map can be applied successfully.

NOTE: In a Layer 2 Policy Map, IPv4/IPv6 rules are not allowed; therefore, the output contains only L2ACL CAM partition entries.

Example

```
Dell# test cam-usage service-policy input pmap_l2 stack-unit
all

For a L2 Input Policy Map pmap_l2, the output must be as
follows,

stack-unit|Portpipe|CAM Partition|Available CAM|Estimated CAM|
Status
        |        |             |             |per Port     |
(Allowed ports)
0           0          L2ACL       500          200
Allowed (2)
0           1          L2ACL       100          200
Exception
1           0          L2ACL       1000         200
Allowed (5)
1           1          L2ACL       0            200
Exception
                       …
                       …
                       …
13          1          L2ACL        400         200
```

```
Allowed (2)
Dell#
```

threshold

Specify the minimum and maximum threshold values for the configured WRED profiles.

S6000

Syntax	`threshold min number max number` **max-drop-probability** To remove the threshold values, use the `no threshold min number max number` command.
Parameters	

min *number*	Enter the keyword `min` then the minimum threshold number for the WRED profile. The range is from 1 to 9360.
min *number*	Enter the keyword `min` then the minimum threshold number for the WRED profile. The range is from 1 to 9360.
max-drop-probability *number*	Enter the keyword **max-drop-probability** followed by the maximum number of packets for the WRED profile. The range is from 0 to 100 KB

Defaults	none
Command Modes	CONFIGURATION (config-wred)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.8.0	Introduced on the S4810.
pre-Version 6.1.1.1	Introduced on the E-Series.

Usage Information	To configure the minimum and maximum threshold values for user-defined profiles, use this command. Additionally, to modify the minimum and maximum threshold values for the pre-defined WRED profiles, use this command. If you delete the threshold values of the pre-defined WRED profiles, the profiles revert to their original default values.

Pre-Defined WRED Profile Name	Minimum Threshold	Maximum Threshold	Maximum Drop Rate
wred_drop	0	0	100
wred_teng_y	594	5941	100
wred_teng_g	594	5941	50
wred_fortyg_y	594	5941	50
wred_fortyg_g	594	5941	25

Related Commands

wred-profile — creates a WRED profile.

trust

Specify dynamic classification (DSCP) or dot1p to trust.

S6000

Syntax

```
trust {diffserv [fallback]| dot1p [fallback]}
```

Parameters

diffserv	Enter the keyword `diffserv` to specify trust of DSCP markings.
dot1p	Enter the keyword `dot1p` to specify trust dot1p configuration.
fallback	Enter the keyword `fallback` to classify packets according to their DSCP value as a secondary option in case no match occurs against the configured class maps.

Defaults

none

Command Modes

CONFIGURATION (conf-policy-map-in)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added `fallback` to the E-Series.
Version 8.2.1.0	Added `dot1p` to the C-Series and S-Series.

Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added `dot1p` and `IPv6 DSCP`.
pre-Version 6.1.1.1	Introduced on the E-Series

Usage Information

When you configure `trust`, matched bytes/packets counters are not incremented in the `show qos statistics` command.

Dynamic mapping honors packets marked according to the standard definitions of DSCP. The following lists the default mapping.

DSCP/CP hex Range (XXX)	DSCP Definition	Traditional IP Precedence	S6000 Internal Queue ID	S-Series Internal Queue ID	DSCP/CP Decimal
111XXX		Network Control	7	3	48–63
110XXX		Internetwork Control	6	3	48–63
101XXX	EF (Expedited Forwarding)	CRITIC/ECP	5	2	32–47
100XXX	AF4 (Assured Forwarding)	Flash Override	4	2	32–47
011XXX	AF3	Flash	3	1	16–31
010XXX	AF2	Immediate	2	1	16–31
001XXX	AF1	Priority	1	0	0–15
000XXX	BE (Best Effort)	Best Effort	0	0	0–15

wred

Designate the WRED profile to yellow or green traffic.

S6000

Syntax

`wred {yellow | green} `*`profile-name`*

To remove the WRED drop precedence, use the no wred {yellow | green} [*profile-name]* command.

Parameters		
	yellow | green	Enter the keyword `yellow` for yellow traffic. A DSCP value of xxx110 and xxx100, xxx101 maps to yellow. Enter the keyword green for `green` traffic. A DSCP value of xxx1xx are green and DSCP 111111 are red packets.
	profile-name	Enter your WRED profile name in character format (16 character maximum). Or use one of the five pre-defined WRED profile names. Pre-defined Profiles: wred_drop, wred-ge_y, wred_ge_g, wred_teng_y, wred_teng_.

Defaults: When WRED green is applied, default WRED yellow profiles take effect and vice-versa.

Command Modes: CONFIGURATION (conf-qos-policy-out)

Command History: This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Profile name character limit increased from 16 to 32.
pre-Version 6.1.1.1	Introduced on the .E-Series

Usage Information: To assign drop precedence to green or yellow traffic, use this command. If there is no honoring enabled on the input, all the traffic defaults to green drop precedence.

Related Commands: wred-profile — creates a WRED profile and name that profile.

trust — defines the dynamic classification to trust DSCP.

wred ecn

To indicate network congestion, rather than dropping packets, use explicit congestion notification (ECN).

S6000

Syntax

```
wred ecn
```

To stop marking packets, use the `no wred ecn` command.

Defaults	none
Command Modes	CONFIGURATION (conf-qos-policy-out)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820t.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Usage Information

When you enable `wred ecn`, and the number of packets in the queue is below the minimum threshold, packets are transmitted per the usual WRED treatment.

When you enable `wred ecn`, and the number of packets in the queue is between the minimum threshold and the maximum threshold, one of the following three scenarios can occur:

- If the transmission endpoints are ECN-capable and traffic is congested, and the WRED algorithm determines that the packet should have been dropped based on the drop probability, the packet is transmitted and marked so the routers know the system is congested and can slow transmission rates.
- If neither endpoint is ECN-capable, the packet may be dropped based on the WRED drop probability. This behavior is the identical treatment that a packet receives when WRED is enabled without ECN configured on the router.

When you enable `wred ecn`, and the number of packets in the queue is above the maximum threshold, packets are dropped based on the drop probability. This behavior is the identical treatment a packet receives when WRED is enabled without ECN configured on the router.

Related Commands

wred-profile — creates a WRED profile and name that profile.

wred weight

Configure the weight factor for computation of average-queue size. This weight value applies to front-end ports. This mechanism to configure a weight for WRED and ECN functionality for front-end ports is supported on the S6000 and Z9000 platforms.

S6000

Syntax

```
[no] wred weight number
```

Parameters

weight	Define the weight factor to be used for computation of the WRED average-queue size to either enable WRED to discard packets or cause ECN to mark packets that exceed the minimum threshold configured. This setting applies to front-end ports only.
number	Enter the weight as a number to be used to calculate the average-queue size. The range is 1 to 15. The default is 0.

Default The default weight is zero.

Command Modes QOS-POLICY-OUT mode

Command History

Version 9.3.0.0	Introduced on the S6000 and Z9000 platforms

Usage Information If the average queue size is more than the maximum threshold of WRED, the packet is dropped. If the average queue size is between the minimum and maximum threshold values, the decision to drop or queue the packet is taken based on the packet drop probability. The probability that a packet is dropped depends on the minimum threshold, maximum threshold, and mark probability denominator.

Example

```
FTOS (conf-qos-policy-out) # wred weight 5
```

wred-profile

Create a WRED profile and name the profile.

S6000

Syntax `wred-profile wred-profile-name`

To remove an existing WRED profile, use the `no wred-profile` command.

Parameters

wred-profile-name	Enter your WRED profile name in character format (16 character maximum). Or use one of the pre-defined WRED profile names. You can configure up to 26 WRED profiles plus the five pre-defined profiles, for a total of 31 WRED profiles. Pre-defined Profiles: wred_drop, wred-ge_y, wred_ge_g, wred_teng_y, wred_teng_g.

Defaults The five pre-defined WRED profiles. When you configure a new profile, the minimum and maximum threshold defaults to predefined wred_ge_g values.

If green profile is applied, default yellow also take effect and vice-versa.

Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
pre-Version 6.1.1.1	Introduced on the E-Series

Usage Information	Use the default pre-defined profiles or configure your own profile. You cannot delete the pre-defined profiles or their default values. This command enables WRED configuration mode —(conf-wred).
Related Commands	threshold — specifies the minimum and maximum threshold values of the WRED profile.

rate shape

Define the rate-shaping method to be either as a measure of bytes or packets for each of the hierarchical QoS (HQoS) nodes at the leaf level to be applied to each queue.

S6000

Syntax

```
[no] rate-shape [kbps | pps] peak-rate [burst-KB/Packets]
[committed [kbps | pps] committed-rate [burst-KB/Packets]]
```

Parameters

kbps	Enter the keyword kbps to specify the committed rate limit in Kilobits per second (Kbps). Specify this value as a multiple of 64. The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
pps	Enter the keyword pps to specify the committed rate limit in packets per second (pps). The range is from 1 to 268000000. The default granularity is Megabits per second (Mbps).
committed-rate	Define the committed rate, which is the guaranteed or minimum confirmed rate for the packets. Specify this value as a multiple of 64 if you specify the committed rate in Kbps. The range is from 0 to 40000000 for Kbps. The range is from 1 to 268000000 for pps. The range is from 0 to 40000 for Mbps (which is the default measure for rate limits if you do not explicitly configure Kbps or pps)

burst-KB	(OPTIONAL) Enter the committed burst size in KB. The range is from 0 to 10000. The default is 50 KB. The default peak burst is regarded as the same value as the configured committed burst size.
Packets	(OPTIONAL) Enter the committed burst size as a count of packets. The range is from 1 to 1073000. The default is 50 packets. The default peak rate is regarded as the same value as the configured committed rate.
peak-rate	Define the peak rate, which is the guaranteed or minimum confirmed rate for the packets. Specify this value as a multiple of 64 if you specify the peak rate in Kbps. The range is from 0 to 40000000 for Kbps. The range is from 1 to 268000000 for pps. The range is from 0 to 40000 for Mbps (which is the default measure for rate limits if you do not explicitly configure Kbps or pps)
kbps	Enter the keyword kbps to specify the peak rate limit in Kilobits per second (Kbps). Specify this value as a multiple of 64. The range is from 0 to 40000000. The default granularity is Megabits per second (Mbps).
pps	Enter the keyword pps to specify the peak rate limit in packets per second (pps). The range is from 1 to 268000000. The default granularity is Megabits per second (Mbps).
peak-rate	Define the peak rate, which is the guaranteed or minimum confirmed rate for the packets. Specify this value as a multiple of 64 if you specify the peak rate in Kbps. The range is from 0 to 40000000 for Kbps. The range is from 1 to 268000000 for pps. The range is from 0 to 40000 for Mbps (which is the default measure for rate limits if you do not explicitly configure Kbps or pps)
burst-KB	(OPTIONAL) Enter the peak burst size in KB. The range is from 0 to 10000. The default is 50 KB.
Packets	(OPTIONAL) Enter the peak burst size as a count of packets. The range is from 1 to 1073000. The default is 50 packets. The default peak rate is regarded as the same value as the configured peak rate.

Default	Granularity for rate is Mbps unless you use the kbps option.
Command Modes	CONFIGURATION
Command History	Version 9.3(0.0) — Added support for committed rate and committed burst size, and for configuration of rate limits on the S6000 platform.
Usage Information	If you specify the pps keyword after the rate-shape command, the peak rate, peak burst, committed rate and committed burst are all considered to be values as a measure of packets. If you do not specify the `pps` or `kbps` keyword, the peak and committed rate settings are considered to be values in Mbps. Similarly, if you enter

the `kbps` keyword, the peak and committed rate settings are treated as values in Kbps.

You cannot configure the committed rate settings to use a different metric or unit from the metric that is set for peak rate attributes because when you use the `rate-shape kbps` command, it denotes the metric for peak and committed rate attributes). Similarly, if you use the `rate-shape pps` option , it denotes the metric for peak rate and committed rate attributes.

If you attempt to define the committed rate to be less than the peak rate, an error message is displayed stating that the peak rate cannot be lower than the committed rate. You can configure all the rate shaping parameters to be either in bytes or packets measure for each queue. The rate and burst parameters for both minimum and maximum settings for a queue can be either in packets or bytes. You cannot configure some of rate shaping attributes to be in bytes measure and the remaining rate shaping attributes to be in packets measure; all the rate shaping attributes must contain the same metric or unit of measure.

Example

```
Dell (conf-qos-policy-out) #rate-shape pps 100 100 peak pps
1000 200

Dell (conf-qos-policy-out) #rate-shape kbps 1024 100 peak kbps
102400 75

Dell (conf-qos-policy-out) # rate-shape 100 100 peak 1000 750

Dell(conf-qos-policy-in)#rate-police 100 25 peak 80 500
% Error: Peak rate cannot be less than committed rate.
```

service-pool wred

A global buffer pool that is a shared buffer pool accessed by multiple queues when the minimum guaranteed buffers for the queue are consumed can be configured on the S6000 and Z9000 platforms.

Create a global buffer pool that is a shared buffer pool accessed by multiple queues when the minimum guaranteed buffers for the queue are consumed. S4810, S4820T, S6000, and Z9000 platforms support four global service-pools in the egress direction. Two service pools are used—one for lossy queues and the other for lossless (priority-based flow control (PFC)) queues. You can enable WRED and ECN configuration on the global service-pools. You can define WRED profiles and weight on each of the global service-pools for both lossy and lossless (PFC) service-pools.

S6000

Syntax

```
[No] service-pool wred {green | weight | yellow} {[pool0
number/string] | [pool1 number/string]}
```

Parameters

service-pool	Define the mapping between the service class and policy-based QoS or routing.
wred	Specify WRED curve parameters for a queue.
green	Specify green (low) drop precedence to a queue.
weight	Specify a weight factor to a queue.

yellow	Specify yellow (medium) drop precedence to a queue.
pool0	Service-pool buffer 1 (default service-pool for PFC traffic) .
pool1	Service-pool buffer 0 (default service-pool for lossy traffic).
number	Enter a weight for the queue as a number in the range of 1 to 15. This parameter applies only if you specify the green or yellow drop precedence.
string	Enter the WRED profile name. It is a string of up to 32 characters. Or use one of the five pre-defined WRED profile names. Pre-defined Profiles: wred_drop, wred-ge_y, wred_ge_g, wred_teng_y, wred_teng_. This parameter applies only if you specify a weight factor.

Default

All queues on backplane ports operate in tail-drop (best-effort traffic) mode by default. There is no default WRED green or yellow profile. The default weight is 0.

Command Modes

CONFIGURATION mode

Command History

Version 9.3.0.0	Introduced on the S6000 and Z9000 platforms

Usage Information

You can configure only service pools 0 and 1 because the Dell Networking OS uses only these two service pools. The pool, service0, is used for lossy queues and the pool, service1, is used for lossless (PFC) queues in all the platforms.

You can configure the weight for the WRED average queue size for service1 on the S6000 Switch, which is the only platform in which PFC is supported for this service pool. On the Z9000 Switch, only service0 can be configured because it does not support PFC.

A WRED profile contains a set of attributes, such as the minimum and maximum threshold values, and the maximum drop rate for the received packets. You can add or remove WRED parameter configurations for one or more shared service pools using a single command. The `service-pool wred` command is similar in usage and working to the `service-class bandwidth-percentage` *`queue-id`* command.

Example

```
Dell(conf-wred) #wred thresh-1
Dell(conf-wred) #threshold min 100 max 200 max-drop-rate 40

Dell(conf-wred) #wred thresh-2
Dell(conf-wred) #threshold min 300 max 400 max-drop-rate 80

Dell(conf) #service-pool wred green pool0 thresh-1 pool1
thresh-2
Dell(conf) #service-pool wred yellow pool0 thresh-3 pool1
thresh-4
Dell(conf) #service-pool wred weight pool0 11 pool1 4
```

DSCP Color Map Commands

The DSCP color map allows you to set the number of specific DSCP values to yellow or red. Traffic marked as yellow delivers traffic to the egress queue which will either transmit the packet if it has available bandwidth or drop the packet due to no ability to send. Traffic marked as red (high drop precedence) is dropped.

dscp

Sets the number of specific DSCP values for a color map profile to yellow or red.

Syntax

```
dscp {yellow | red} [list-dscp-values]
```

To remove a color policy map profile, use the `no dscp {yellow | red} [dscp-list]` command.

Parameters

Yellow	Enter the `yellow` keyword. Traffic marked as yellow delivers traffic to the egress queue which either transmits the packet if it has available bandwidth or drops the packet due to no ability to send.
Red	Enter the `red` keyword. Traffic marked as red is dropped.
dscp-list	Enter a list of IP DSCP values. The *dscp-list* parameter specifies the full list of IP DSCP value(s) for the specified color. Each DSCP value in a list is separate values by commas – no spaces (1,2,3) or indicates a list of values separated by a hyphen (1-3). Range is `0` to `63`.

Defaults **None**

Command Modes CONFIG-COLOR-MAP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information

If the specified color-map does not exist, the Diffserv Manager (DSM) creates a color map and sets all the DSCP values to green (low drop precedence).

The default setting for each DSCP value (0-63) is green (low drop precedence). This command allows setting the number of specific DSCP values to yellow or red.

Important Points to Remember

- All DSCP values that are not specified as yellow or red are colored green.
- A DSCP value cannot be in both the yellow and red lists. Setting the red or yellow list with any DSCP value that is already in the other list results in an error and no update to that list is made.
- Each color map can only have one list of DSCP values for each color; any DSCP values previously listed for that color that are not in the new DSCP list are colored green.

Example

```
Dell(conf-dscp-color-map)# dscp yellow 9,10,11,13,15,16
```

Related Commands

qos dscp-color-map — configures the DSCP color map

qos dscp-color-policy— configures a DSCP color policy

qos dscp-color-map

Configure the DSCP color map.

Syntax

```
qos dscp-color-map map-name
```

To remove a color map, use the no `qos dscp-color-map` *map-name* command.

Parameters

map-name	Enter the name of the DSCP color map. The map name can have a maximum of 32 characters.

Defaults **None**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information

A color map outlines the codepoint mappings to the appropriate color mapping (green, yellow, red) for the traffic. The system uses this information use to handle the traffic on the interface based on the traffic priority and places it into the appropriate shaping queue. You cannot delete a DSCP color map when it is configured on an interface. If you do, all the DSCP values are set to green (low drop precedence). To delete the DSCP color map that is being used by one or more interfaces, remove the DSCP map from each interface.

Example

```
Dell(conf)#qos dscp-color-map mymap
```

Related Commands	qos dscp-color-map— associates the DSCP color map profile with an interface so that all IP packets received on it is given a color based on that color map dscp— sets the number of specific DSCP values for color map profile to yellow or red.

qos dscp-color-policy

Associates the DSCP color map profile with an interface so that all IP packets received on it is given a color based on that color map.

Syntax

`dscp-color-policy` *`color-map-profile-name`*

To remove a color policy map profile, use the no `dscp-color-policy` *`color-map-profile-name`* command.

Parameters

color-map-profile-name	Enter the color map profile name. The name can have a maximum of 32 characters.

Defaults

None

Command Modes

CONFIG-INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information

If the specified color-map does not exist, the Diffserv Manager (DSM) creates a color map and sets all the DSCP values to green (low drop precedence).

Example

The following example assigns the color map, **bat-enclave-map**, to interface **te 0/11**.

```
Dell(conf)# int te 0/11
Dell(conf-if-te-0/11)# qos dscp-color-policy bat-enclave-map
```

Related Commands

dscp— sets the number of specific DSCP values for color map profile to yellow or red.

qos dscp-color-map— configures the DSCP color map.

show qos dscp-color-policy

Display DSCP color policy configuration for one or all interfaces.

Syntax

```
show qos dscp-color-policy{summary [interface] | detail
{interface}}
```

Parameters

summary	Enter the `summary` keyword to display summary information about a color policy on one or more interfaces.
Detail	Enter the `detail` keyword to display detailed information about a color policy on one or more interfaces.
interface	Enter the name of the interface that has color policy configured.

Defaults

None

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5.0.0	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Example

```
Display summary information about a color policy on one or
more interfaces.

Dell# show qos dscp-color-policy summary

Interface     dscp-color-map
TE 0/10      mapONE
TE0/11       mapTWO

Display summary information about a color policy on a specific
interface.

Dell# show qos dscp-color-policy summary te 0/10
Interface    dscp-color-map
TE 0/10      mapONE

Displayed detailed color policy information on an interface.

Dell# show qos dscp-color-policy detail te 0/10
Interface TenGigabitEthernet 0/10

Dscp-color-map mapONE
  yellow 4,7
  red 20,30
```

Related Commands	— Displays DSCP color maps show qos dscp-color-map

show qos dscp-color-map

Display the DSCP color map for one or all interfaces.

Syntax	`show qos dscp-color-map` *`map-name`*
Parameters	*map-name* Enter the name of the color map.
Defaults	**None**
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command. Version 9.5.0.0 Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Example

```
Display all DSCP color maps.

Dell# show qos dscp-color-map
Dscp-color-map mapONE
  yellow 4,7
  red 20,30
Dscp-color-map mapTWO
  yellow 16,55

Display a specific DSCP color map.

Dell# show qos dscp-color-map mapTWO
Dscp-color-map mapTWO
  yellow 16,55
```

Related Commands	show qos dscp-color-policy — Displaying a DSCP Color Policy Configuration

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Routing Information Protocol (RIP)

Routing information protocol (RIP) is a distance vector routing protocol. The Dell Networking operating software supports both RIP version 1 (RIPv1) and RIP version 2 (RIPv2) on the S6000 platform.

The Dell Networking OS implementation of RIP is based on IETF RFCs 2453 and RFC 1058. For more information about configuring RIP, refer to the *Dell Networking OS Configuration Guide*.

auto-summary

Restore the default behavior of automatic summarization of subnet routes into network routes. This command applies only to RIP version 2.

S6000

Syntax	`auto-summary` To send sub-prefix routing information, use the `no auto-summary` command.
Defaults	Enabled.
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

clear ip rip

Update all the RIP routes in the Dell Networking OS routing table.

S6000

Syntax	`clear ip rip`
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information	This command triggers updates of the main RIP routing tables.

debug ip rip

Examine RIP routing information for troubleshooting.

S6000

Syntax

```
debug ip rip [interface | database | events [interface] |
trigger]
```

To turn off debugging output, use the `no debug ip rip` command.

Parameters

interface	(OPTIONAL) Enter the interface type and ID as one of the following: • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.

- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

database	(OPTIONAL) Enter the keyword `database` to display messages when there is a change to the RIP database.
events	(OPTIONAL) Enter the keyword `events` to debug only RIP protocol changes.
trigger	(OPTIONAL) Enter the keyword `trigger` to debug only RIP trigger extensions.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

default-information originate

Generate a default route for the RIP traffic.

S6000

Syntax

```
default-information originate [always] [metric metric-value]
[route-map map-name]
```

To return to the default values, use the `no default-information originate` command.

Parameters

always	(OPTIONAL) Enter the keyword `always` to enable the switch software to always advertise the default route.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number as the metric value. The range is from 1 to 16. The default is **1**.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route-map.

Defaults Disabled. Metric: **1**.

Command Modes ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The default route must be present in the switch routing table for the `default-information originate` command to take effect.

default-metric

Change the default metric for routes. To ensure that all redistributed routes use the same metric value, use this command with the `redistribute` command.

S6000

Syntax `default-metric *number*`

To return the default metric to the original values, use the `no default-metric` command.

Parameters

number	Specify a number. The range is from 1 to 16. The default is **1**.

Defaults **1**

Command Modes ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

This command ensures that route information being redistributed is converted to the same metric value.

Related Commands

redistribute — allows you to redistribute routes learned by other methods.

description

Enter a description of the RIP routing protocol.

S6000

Syntax `description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the RIP protocol (80 characters maximum).

Defaults none

Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 7.7.1.0	Introduced on the E-Series.

Related Commands	router rip — enters ROUTER mode on the switch.

distance

Assign a weight (for prioritization) to all routes in the RIP routing table or to a specific route. Lower weights (“administrative distance”) are preferred.

S6000

Syntax

`distance weight [ip-address mask [prefix-name]]`

To return to the default values, use the `no distance weight [ip-address mask]` command.

Parameters

weight	Enter a number from 1 to 255 for the weight (for prioritization). The default is **120**.
ip-address	(OPTIONAL) Enter the IP address, in dotted decimal format (A.B.C.D), of the host or network to receive the new distance metric.
mask	If you enter an IP address, also enter a mask for that IP address, in either dotted decimal format or /prefix format (/x).
prefix-name	(OPTIONAL) Enter a configured prefix list name.

Defaults	weight = **120**
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands	default-metric — assigns one distance metric to all routes learned using the `redistribute` command.

distribute-list in

Configure a filter for incoming routing updates.

S6000

Syntax	`distribute-list` *`prefix-list-name`* `in [`*`interface`*`]` To delete the filter, use the `no distribute-list` *`prefix-list-name`* `in` command.

Parameters

prefix-list-name	Enter the name of a configured prefix list.
interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults	Not configured.
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.29.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

ip prefix-list — enters PREFIX-LIST mode and configures a prefix list.

distribute-list out

Configure a filter for outgoing routing updates.

S6000

Syntax

`distribute-list prefix-list-name out [interface | bgp | connected | isis |ospf | static]`

To delete the filter, use the `no distribute-list prefix-list-name out` command.

Parameters

prefix-list-name	Enter the name of a configured prefix list.

interface	(OPTIONAL) Identifies the interface type slot/port as one of the following: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.
connected	(OPTIONAL) Enter the keyword `connected` to filter only directly connected routes.
isis	(OPTIONAL) Enter the keyword `isis` to filter only IS-IS routes.
ospf	(OPTIONAL) Enter the keyword `ospf` to filter all OSPF routes.
static	(OPTIONAL) Enter the keyword `static` to filter manually configured routes.

Defaults	Not configured.
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

ip prefix-list — enters PREFIX-LIST mode and configures a prefix list.

ip poison-reverse

Set the prefix of the RIP routing updates to the RIP infinity value.

S6000

Syntax	`ip poison-reverse` To disable poison reverse, use the `no ip poison-reverse` command.
Defaults	Disabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands	ip split-horizon — sets the RIP routing updates to exclude routing prefixes.

ip rip receive version

To receive specific versions of RIP, set the interface. The RIP version you set on the interface overrides the version command in ROUTER RIP mode.

S6000

Syntax	`ip rip receive version [1] [2]` To return to the default, use the `no ip rip receive version` command.
Parameters	1 — (OPTIONAL) Enter the number `1` for RIP version 1.

2	(OPTIONAL) Enter the number `2` for RIP version 2.

Defaults

RIPv1 and **RIPv2**

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

If you want the interface to receive both versions of RIP, use the `ip rip receive version 1 2` command.

Related Commands

ip rip send version — sets the RIP version for sending RIP traffic on an interface.

version — sets the RIP version the switch software uses.

ip rip send version

To send a specific version of RIP, set the interface. The version you set on the interface overrides the version command in ROUTER RIP mode.

S6000

Syntax

```
ip rip send version [1] [2]
```

To return to the default value, use the `no ip rip send version` command.

Parameters

1	(OPTIONAL) Enter the number `1` for RIP version 1. The default is RIP version 1.
2	(OPTIONAL) Enter the number `2` for RIP version 2.

Defaults	**RIPv1**
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information	To enable the interface to send both version of RIP packets, use the `ip rip send version 1 2` command.
Related Commands	ip rip receive version — sets the RIP version for the interface to receive traffic. version — sets the RIP version for the switch software.

ip split-horizon

Enable split-horizon for RIP data on the interface. As described in RFC 2453, the split-horizon scheme prevents any routes learned over a specific interface to be sent back out that interface.

S6000

Syntax	`ip split-horizon` To disable split-horizon, use the `no ip split-horizon` command.
Defaults	Enabled
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

ip poison-reverse — sets the prefix for RIP routing updates.

maximum-paths

Set RIP to forward packets over multiple paths.

S6000

Syntax

`maximum-paths` *`number`*

To return to the default values, use the `no maximum-paths` commands.

Parameters

number	Enter the number of paths. The range is from 1 to 16. The default is **4** paths.

Defaults

4

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

RIP supports a maximum of 16 ECMP paths.

neighbor

Define a neighbor router with which to exchange RIP information.

S6000

Syntax

`neighbor ip-address`

To delete a neighbor setting, use the `no neighbor ip-address` command.

Parameters

ip-address	Enter the IP address, in dotted decimal format, of a router with which to exchange information.

Defaults

Not configured.

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

When a neighbor router is identified, unicast data exchanges occur. Multiple neighbor routers are possible.

To ensure that only specific interfaces are receiving and sending data, use the `passive-interface` command with the `neighbor` command.

Related Commands	passive-interface — sets the interface to only listen to RIP broadcasts.

network

Enable RIP for a specified network. To enable RIP on all networks connected to the switch, use this command.

S6000

Syntax

```
network ip-address
```

To disable RIP for a network, use the `no network ip-address` command.

Parameters

ip-address	Specify an IP network address in dotted decimal format. You cannot specify a subnet.

Defaults

No RIP network is configured.

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

You can enable an unlimited number of RIP networks.

RIP operates over interfaces configured with any address the `network` command specifies.

offset-list

Specify a number to add to the incoming or outgoing route metrics learned using RIP.

S6000

Syntax	`offset-list` *`prefix-list-name`* `{in | out}` *`offset`* `[`*`interface`*`]` To delete an offset list, use the `no offset-list` *`prefix-list-name`* `{in | out}` *`offset`* `[`*`interface`*`]` command.

Parameters

prefix-list-name	Enter the name of an established Prefix list to determine which incoming routes are modified.
offset	Enter a number from zero (0) to 16 to be applied to the incoming route metric matching the access list specified. If you set an offset value to zero (0), no action is taken.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults	Not configured.
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.

Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information When the offset metric is applied to an interface, that value takes precedence over an offset value that is not extended to an interface.

Related Commands ip prefix-list — enters PREFIX-LIST mode and configure a prefix list.

output-delay

Set the interpacket delay of successive packets to the same neighbor.

S6000

Syntax `output-delay delay`

To return to the switch software defaults for interpacket delay, use the `no output-delay` command.

Parameters

delay	Specify a number of milliseconds as the delay interval. The range is from 8 to 50.

Defaults Not configured.

Command Modes ROUTER RIP

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information	This command is intended for low-speed interfaces.

passive-interface

Suppress routing updates on a specified interface.

S6000

Syntax

`passive-interface interface`

To delete a passive interface, use the `no passive-interface interface` command.

Parameters

interface	Enter the following information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For a VLAN, enter the keyword `vlan` then a number from 1 to 4094.

Defaults	Not configured.
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.

Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Although the passive interface does not send or receive routing updates, the network on that interface still includes in RIP updates sent using other interfaces.

Related Commands

neighbor — enables RIP for a specified network.

network — defines a neighbor.

redistribute

Redistribute information from other routing instances.

S6000

Syntax

`redistribute {connected | static}`

To disable redistribution, use the no redistribute {connected | static} command.

Parameters

connected	Enter the keyword `connected` to specify that information from active routes on interfaces is redistributed.
static	Enter the keyword `static` to specify that information from static routes is redistributed.

Defaults

Not configured.

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.

pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

To redistribute the default route (0.0.0.0/0), configure the `default-information originate` command.

Related Commands

default-information originate — generates a default route for RIP traffic.

redistribute isis

Redistribute routing information from an IS-IS instance.

Syntax

`redistribute isis [`*`tag`*`] [level-1 | level-1-2 | level-2] [metric `*`metric-value`*`] [route-map `*`map-name`*`]`

To disable redistribution, use the `no redistribute isis [`*`tag`*`] [level-1 | level-1-2 | level-2] [metric `*`metric-value`*`] [route-map `*`map-name`*`]` command.

Parameters

tag	(OPTIONAL) Enter the name of the IS-IS routing process.
level-1	(OPTIONAL) Enter the keywords `level-1` to redistribute only IS-IS Level-1 routes.
level-1-2	(OPTIONAL) Enter the keywords `level-1-2` to redistribute both IS-IS Level-1 and Level-2 routes.
level-2	(OPTIONAL) Enter the keywords `level-2` to redistribute only IS-IS Level-2 routes.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number as the metric value. The range is from 0 to 16.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route map.

Defaults

Not configured.

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *FTOS Command Line Reference Guide*.

The following is a list of the FTOS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
pre-Version 6.2.1.1	Introduced on the E-Series.

redistribute ospf

Redistribute routing information from an OSPF process.

S6000

Syntax

`redistribute ospf` *`process-id`* `[match external {1 | 2} | match internal | metric` *`metric-value`*`] [route-map` *`map-name`*`]`

To disable redistribution, use the `no redistribute ospf` *`process-id`* `[match external {1 | 2} | match internal | metric` *`metric-value`*`] [route-map` *`map-name`*`]` command.

Parameters

process-id	Enter a number that corresponds to the OSPF process ID to redistribute. The range is from 1 to 65355.
match external {1 | 2}	(OPTIONAL) Enter the keywords `match external` then the numbers `1` or `2` to indicated that external 1 routes or external 2 routes should be redistributed.
match internal	(OPTIONAL) Enter the keywords `match internal` to indicate that internal routes should be redistributed.
metric *metric-value*	(OPTIONAL) Enter the keyword `metric` then a number as the metric value. The range is from 0 to 16.
route-map *map-name*	(OPTIONAL) Enter the keywords `route-map` then the name of a configured route map.

Defaults

Not configured.

Command Modes

ROUTER RIP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

router rip

To configure and enable RIP, enter ROUTER RIP mode.

S6000

Syntax

`router rip`

To disable RIP, use the `no router rip` command.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

To enable RIP, assign a network address using the `network` command.

Example

```
Dell(conf)#router rip
Dell(conf-router_rip)#
```

Related Commands	network — enables RIP. exit — returns to CONFIGURATION mode.

show config

Display the changes you made to the RIP configuration. The default values are not shown.

S6000

Syntax	`show config`
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell(conf-router_rip)#show config
!
router rip
  network 172.31.0.0
  passive-interface GigabitEthernet 0/1
Dell(conf-router_rip)#
```

show ip rip database

Display the routes that RIP learns. If the switch learned no RIP routes, no output is generated.

S6000

Syntax `show ip rip database [ip-address mask]`

Parameters

ip-address	(OPTIONAL) Specify an IP address in dotted decimal format to view RIP information on that network only. If you enter an IP address, also enter a mask for that IP address.
mask	(OPTIONAL) Specify a mask, in /network format, for the IP address.

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show ip rip database` command shown in the following example.

Field	Description
Total number of routes in RIP database	Displays the number of RIP routes stored in the RIP database.
100.10.10.0/24 directly connected	Lists the routes directly connected.
150.100.0.0 redistributed	Lists the routes learned through redistribution.
209.9.16.0/24...	Lists the routes and the sources advertising those routes.

Example

```
Dell#show ip rip database
Total number of routes in RIP database: 1624
204.250.54.0/24
      [50/1] via 192.14.1.3, 00:00:12, GigabitEthernet 9/15
204.250.54.0/24     auto-summary
203.250.49.0/24
      [50/1] via 192.13.1.3, 00:00:12, GigabitEthernet 9/14
203.250.49.0/24     auto-summary
210.250.40.0/24
      [50/2] via 1.1.18.2, 00:00:14, Vlan 18
      [50/2] via 1.1.130.2, 00:00:12, Port-channel 30
210.250.40.0/24     auto-summary
207.250.53.0/24
      [50/2] via 1.1.120.2, 00:00:55, Port-channel 20
      [50/2] via 1.1.130.2, 00:00:12, Port-channel 30
      [50/2] via 1.1.10.2, 00:00:18, Vlan 10
207.250.53.0/24     auto-summary
208.250.42.0/24
      [50/2] via 1.1.120.2, 00:00:55, Port-channel 20
      [50/2] via 1.1.130.2, 00:00:12, Port-channel 30
      [50/2] via 1.1.10.2, 00:00:18, Vlan 10
208.250.42.0/24     auto-summary
```

show running-config rip

Display the current RIP configuration.

S6000

Syntax `show running-config rip`

Defaults none

Command Modes EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.7.1.0	Introduced on the C-Series.
Version 7.6.1.0	Introduced on the E-Series.

Example

```
show running-config rip
!
router rip
  distribute-list Test1 in
  distribute-list Test21 out
  network 10.0.0.0
  passive-interface GigabitEthernet 2/0
  neighbor 20.20.20.20
  redistribute ospf 999
  version 2
```

timers basic

Manipulate the RIP timers for routing updates, invalid, holddown times, and flush time.

S6000

Syntax

`timers basic update` *`invalid holddown flush`*

To return to the default settings, use the `no timers basic` command.

Parameters

update	Enter the number of seconds to specify the rate at which RIP routing updates are sent. The range is from zero (0) to 4294967295. The default is **30 seconds**.
invalid	Enter the number of seconds to specify the time interval before routing updates are declared invalid or expired. The invalid value should be at least three times the update timer value. The range is from zero (0) to 4294967295. The default is **180 seconds**.
holddown	Enter the number of seconds to specify a time interval during which the route is marked as unreachable but still sending RIP packets. The holddown value should be at least three times the update timer value. The range is from zero (0) to 4294967295. The default is **180 seconds**.
flush	Enter the number of seconds to specify the time interval during which the route is advertised as unreachable. When this interval expires, the route is flushed from the routing table. The flush value should be greater than the update value. The range is from zero (0) to 4294967295. The default is **240 seconds**.

Defaults

- update = **30 seconds**
- invalid = **180 seconds**
- holddown = **180 seconds**
- flush = **240 seconds**

Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information	If you change the timers on one router, also synchronize the timers on all routers in the RIP domain.

version

Specify either RIP version 1 or RIP version 2.

S6000

Syntax	`version {1 | 2}` To return to the default version setting, use the `no version` command.
Parameters	

1	Enter the keyword `1` to specify RIP version 1.
2	Enter the keyword `2` to specify RIP version 2.

Defaults	The Dell Networking OS sends RIPv1 and receives RIPv1 and RIPv2.
Command Modes	ROUTER RIP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands	ip rip receive version — sets the RIP version the interface receives. ip rip send version — sets the RIP version the interface sends.

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Remote Monitoring (RMON)

The Dell Networking operating software remote monitoring (RMON) is implemented on the S6000 platform.

Dell Networking OS RMON is based on IEEE standards, providing both 32-bit and 64-bit monitoring and long-term statistics collection. Dell Networking OS RMON supports the following RMON groups, as defined in RFC-2819, RFC-3273, RFC-3434, and RFC-4502:

- Ethernet Statistics Table; RFC-2819
- Ethernet Statistics High-Capacity Table; RFC-3273, 64bits
- Ethernet History Control Table; RFC-2819
- Ethernet History Table; RFC-2819
- Ethernet History High-Capacity Table; RFC-3273, 64bits
- Alarm Table; RFC-2819
- High-Capacity Alarm Table (64bits); RFC-3434, 64bits
- Event Table; RFC-2819
- Log Table; RFC-2819
- User History; RFC-4502
- Probe Configuration (Capabilities, SoftwareRev, HardwareRev, DateTime and ResetControl); RFC-4502

Dell Networking OS RMON does not support the following statistics:

- etherStatsCollisions
- etherHistoryCollisions
- etherHistoryUtilization

NOTE: Only SNMP GET/GETNEXT access is supported. Configure RMON using the RMON commands. Collected data is lost during a chassis reboot.

rmon alarm

Set an alarm on any MIB object.

S6000

Syntax	`rmon alarm` *number variable interval* `{delta	absolute} rising-threshold` *value event-number* `falling-threshold` *value event-number* `[owner` *string*`]` To disable the alarm, use the `no rmon alarm` *number* command.

Parameters

number	Enter the alarm integer number from 1 to 65535. The value must be unique in the RMON alarm table.
variable	Enter the MIB object to monitor. The variable must be in the SNMP OID format; for example, 1.3.6.1.2.1.1.3. The object type must be a 32-bit integer.
interval	Time, in seconds, the alarm monitors the MIB variables; this is the alarmSampleType in the RMON alarm table. The range is from 5 to 3600 seconds.
delta	Enter the keyword `delta` to test the change between MIB variables. This is the alarmSampleType in the RMON alarm table.
absolute	Enter the keyword `absolute` to test each MIB variable directly. This is the alarmSampleType in the RMON alarm table.
rising-threshold *value event-number*	Enter the keywords `rising-threshold` then the value (32 bit) the rising-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the rising threshold exceeds its limit. This value is the same as the alarmRisingEventIndex or alarmTable of the RMON MIB. If there is no corresponding rising-threshold event, the value is zero.
falling-threshold *value event-number*	Enter the keywords `falling-threshold` then the value (32 bit) the falling-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the falling threshold exceeds its limit. This value is the same as the alarmFallingEventIndex or the alarmTable of the RMON MIB. If there is no corresponding falling-threshold event, the value is zero.
owner *string*	(OPTIONAL) Enter the keyword `owner` then the owner name to specify an owner for the alarm. This is the alarmOwner object in the alarmTable of the RMON MIB.

Defaults **owner**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

rmon collection history

Enable the RMON MIB history group of statistics collection on an interface.

S6000

Syntax

`rmon collection history {controlEntry *integer*} [owner *name*] [buckets *number*] [interval *seconds*]`

To remove a specified RMON history group of statistics collection, use the `no rmon collection history {controlEntry integer}` command.

Parameters

controlEntry *integer*	Enter the keyword `controlEntry` to specify the RMON group of statistics using a value. Then enter an integer value from 1 to 65535 that identifies the RMON group of statistics. The integer value must be a unique index in the RMON history table.
owner *name*	(OPTIONAL) Enter the keyword `owner` then the owner name to record the owner of the RMON group of statistics.
buckets *number*	(OPTIONAL) Enter the keyword `buckets` then the number of buckets for the RMON collection history group of statistics. The bucket range is from 1 to 1000. The default is **50**.
interval *seconds*	(OPTIONAL) Enter the keyword `interval` then the number of seconds in each polling cycle. The range is from 5 to 3600 seconds. The default is **1800 seconds**.

Defaults

none

Command Modes

CONFIGURATION INTERFACE (config-if)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

rmon collection statistics

Enable RMON MIB statistics collection on an interface.

S6000

Syntax

`rmon collection statistics {controlEntry integer} [owner name]`

To remove RMON MIB statistics collection on an interface, use the `no rmon collection statistics {controlEntry integer}` command.

Parameters

controlEntry *integer*	Enter the keyword `controlEntry` to specify the RMON group of statistics using a value. Then enter an integer value from 1 to 65535 that identifies the RMON Statistic Table. The integer value must be a unique in the RMON statistic table.
owner *name*	(OPTIONAL) Enter the keyword `owner` then the owner name to record the owner of the RMON group of statistics.

Defaults

none

Command Modes

CONFIGURATION INTERFACE (config-if)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

rmon event

Add an event in the RMON event table.

S6000

Syntax

```
rmon event number [log] [trap community] [description string]
```

To disable RMON on an interface, use the `no rmon event number` command.

Parameters

number	Assign an event number in integer format. The range is from 1 to 65535. You must ensure that the value you enter is unique in the RMON event table.
log	(OPTIONAL) Enter the keyword `log` to generate an RMON event log. This option sets the eventType to either log or log-and-snmptrap in the RMON event table. The default is None.
trap *community*	(OPTIONAL) Enter the keyword `trap` followed by the SNMP community string to generate SNMP traps for an RMON event entry. This option sets the eventType to either snmptrap or log-and-snmptrap in the RMON event table. In addition to the SNMP traps, this option also generates a syslog.
description *string*	(OPTIONAL) Enter the keyword `description` then a string describing the event.
owner *name*	(OPTIONAL) Enter the keyword `owner` then the name of the owner of this event.

Defaults As noted in the *Parameters* section.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

rmon hc-alarm

Set an alarm on any MIB object.

S6000

Syntax

```
rmon hc-alarm number variable interval {delta | absolute}
rising-threshold value event-number falling-threshold value
event-number [owner string]
```

To disable the alarm, use the `no rmon hc-alarm number` command.

Parameters

number	Enter the alarm integer number from 1 to 65535. The value must be unique in the RMON alarm table.
variable	The MIB object to monitor. The variable must be in the SNMP OID format; for example, 1.3.6.1.2.1.1.3 The object type must be a 64-bit integer.
interval	Time, in seconds, the alarm monitors the MIB variables; this is the alarmSampleType in the RMON alarm table. The range is from 5 to 3600 seconds.
delta	Enter the keyword `delta` to test the change between MIB variables. This is the alarmSampleType in the RMON alarm table.
absolute	Enter the keyword `absolute` to test each MIB variable directly. This is the alarmSampleType in the RMON alarm table.
rising-threshold *value event-number*	Enter the keywords `rising-threshold` then the value (64 bit) the rising-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the rising threshold exceeds its limit. This value is the same as the alarmRisingEventIndex or alarmTable of the RMON MIB. If there is no corresponding rising-threshold event, the value is zero.

falling-threshold *value event-number*	Enter the keywords `falling-threshold` then the value (64 bit) the falling-threshold alarm is either triggered or reset. Then enter the event-number to trigger when the falling threshold exceeds its limit. This value is the same as the alarmFallingEventIndex or the alarmTable of the RMON MIB. If there is no corresponding falling-threshold event, the value is zero.
owner *string*	(OPTIONAL) Enter the keyword `owner` then the owner name to specify an owner for the alarm. This is the alarmOwner object in the alarmTable of the RMON MIB.

Defaults	**owner**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

show rmon

Display the RMON running status including the memory usage.

S6000

Syntax	`show rmon`
Defaults	none
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell# show rmon
RMON status
  total memory used 218840 bytes.
  ether statistics table: 8 entries, 4608 bytes
  ether history table: 8 entries, 6000 bytes
  alarm table: 390 entries, 102960 bytes
  high-capacity alarm table: 5 entries, 1680 bytes
  event table: 500 entries, 206000 bytes
  log table: 2 entries, 552 bytes
Dell#
```

show rmon alarms

Display the contents of the RMON alarm table.

S6000

Syntax `show rmon alarms [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON alarm table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Example (Index)

```
Dell#show rmon alarm 1
RMON alarm entry 1
  sample Interval: 5
  object: 1.3.6.1.2.1.1.3
  sample type: absolute value.
  value: 255161
  alarm type: rising or falling alarm.
  rising threshold: 1, RMON event index: 1
  falling threshold: 501, RMON event index: 501
  alarm owner: 1
  alarm status: OK
Dell#
```

Example (Brief)

```
Dell#show rmon alarm br
index   SNMP OID
--------------------------
1       1.3.6.1.2.1.1.3
2       1.3.6.1.2.1.1.3
3       1.3.6.1.2.1.1.3
4       1.3.6.1.2.1.1.3
5       1.3.6.1.2.1.1.3
6       1.3.6.1.2.1.1.3
7       1.3.6.1.2.1.1.3
8       1.3.6.1.2.1.1.3
9       1.3.6.1.2.1.1.3
10      1.3.6.1.2.1.1.3
11      1.3.6.1.2.1.1.3
12      1.3.6.1.2.1.1.3
13      1.3.6.1.2.1.1.3
14      1.3.6.1.2.1.1.3
15      1.3.6.1.2.1.1.3
16      1.3.6.1.2.1.1.3
17      1.3.6.1.2.1.1.3
18      1.3.6.1.2.1.1.3
19      1.3.6.1.2.1.1.3
20      1.3.6.1.2.1.1.3
21      1.3.6.1.2.1.1.3
22      1.3.6.1.2.1.1.3
Dell#
```

show rmon events

Display the contents of the RMON event table.

S6000

Syntax `show rmon events [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON event table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Example (Index)

```
Dell(conf)#rmon event 111                -> Default case
Dell(conf)#rmon event 112 log            -> Only “log” option
Dell(conf)#rmon event 113 trap private   -> Only “trap” option
Dell(conf)#rmon event 114 log trap public-> Both “log” and
“trap” options
Dell(conf)#do show rmon events
RMON event entry 111
    description:
    event type: none.
    event community:
    event last time sent: none
    event owner:
    event status: OK
RMON event entry 112
    description:
    event type: LOG.
    event community:
    event last time sent: none
    event owner:
    event status: OK
```

```
RMON event entry 113
    description:
    event type: SNMP TRAP.
    event community: private
    event last time sent: none
    event owner:
    event status: OK
RMON event entry 114
    description:
    event type: LOG and SNMP TRAP.
    event community: public
    event last time sent: none
    event owner:
    event status: OK
```

Example (Brief)

```
Dell#show rmon event brief
index    description
------------------------------
1        1
2        2
3        3
4        4
5        5
6        6
7        7
8        8
9        9
10       10
11       11
12       12
13       13
14       14
15       15
16       16
17       17
18       18
19       19
20       20
21       21
22       22
Dell#
```

show rmon hc-alarm

Display the contents of RMON High-Capacity alarm table.

S6000

Syntax `show rmon hc-alarm [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON High-Capacity alarm table in an easy-to-read format.

Defaults	none
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Example (Index)

```
Dell#show rmon hc-alarm 1
RMON high-capacity alarm entry 1
  object: 1.3.6.1.2.1.1.3
  sample interval: 5
  sample type: absolute value.
  value: 185638
  alarm type: rising or falling alarm.
  alarm rising threshold value: positive.
  rising threshold: 1001, RMON event index: 1
  alarm falling threshold value: positive.
  falling threshold: 999, RMON event index: 6
  alarm sampling failed 0 times.
  alarm owner: 1
  alarm storage type: non-volatile.
  alarm status: OK
Dell#
```

Example (Brief)

```
Dell#show rmon hc-alarm brief
index     SNMP OID
----------------------------------
1         1.3.6.1.2.1.1.3
2         1.3.6.1.2.1.1.3
3         1.3.6.1.2.1.1.3
4         1.3.6.1.2.1.1.3
5         1.3.6.1.2.1.1.3
Dell#
```

show rmon history

Display the contents of the RMON Ethernet history table.

S6000

Syntax `show rmon history [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON Ethernet history table in an easy-to-read format

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Example (Index)

```
Dell#show rmon history 6001
RMON history control entry 6001
interface: ifIndex.100974631 TenGigabitEthernet 2/0
bucket requested: 1
bucket granted: 1
sampling interval: 5 sec
owner: 1
status: OK
Dell#
```

Example (Brief)

```
Dell#show rmon history brief
index ifIndex interface
---------------------------------------------------------------
------
6001 100974631 TenGigabitEthernet 2/0
6002 100974631 TenGigabitEthernet 2/0
6003 101236775 TenGigabitEthernet 2/1
6004 101236775 TenGigabitEthernet 2/1
9001 134529054 TenGigabitEthernet 3/0
```

```
9002 134529054 TenGigabitEthernet 3/0
9003 134791198 TenGigabitEthernet 3/1
9004 134791198 TenGigabitEthernet 3/1
Dell#
```

show rmon log

Display the contents of the RMON log table.

S6000

Syntax

`show rmon log [index] [brief]`

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON log table in an easy-to-read format.

Defaults

none

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The log table has a maximum of 500 entries. If the log exceeds that maximum, the oldest log entry is purged to allow room for the new entry.

Example (Index)

```
Dell#show rmon log 2
RMON log entry, alarm table index 2, log index 1
  log time: 14638 (THU AUG 12 22:10:40 2004)
  description: 2
Dell#
```

Example (Brief)

```
Dell#show rmon log br
eventIndex     description
------------------------------
2              2
4              4
Dell#
```

show rmon statistics

Display the contents of RMON Ethernet statistics table.

S6000

Syntax

```
show rmon statistics [index] [brief]
```

Parameters

index	(OPTIONAL) Enter the table index number to display just that entry.
brief	(OPTIONAL) Enter the keyword `brief` to display the RMON Ethernet statistics table in an easy-to-read format.

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Introduced on the E-Series.

Example (Index)

```
Dell#show rmon statistics 6001
RMON statistics entry 6001
  interface: ifIndex.100974631 TenGigabitEthernet 2/0
  packets dropped: 0
  bytes received: 0
  packets received: 0
  broadcast packets: 0
  multicast packets: 0
  CRC error: 0
  under-size packets: 0
  over-size packets: 0
  fragment errors: 0
  jabber errors: 0
  collision: 0
  64bytes packets: 0
  65-127 bytes packets: 0
  128-255 bytes packets: 0
  256-511 bytes packets: 0
  512-1023 bytes packets: 0
  1024-1518 bytes packets: 0
  owner: 1
  status: OK
  <high-capacity data>
  HC packets received overflow: 0
  HC packets received: 0
  HC bytes received overflow: 0
  HC bytes received: 0
  HC 64bytes packets overflow: 0
  HC 64bytes packets: 0
  HC 65-127 bytes packets overflow: 0
  HC 65-127 bytes packets: 0
  HC 128-255 bytes packets overflow: 0
  HC 128-255 bytes packets: 0
  HC 256-511 bytes packets overflow: 0
  HC 256-511 bytes packets: 0
  HC 512-1023 bytes packets overflow: 0
  HC 512-1023 bytes packets: 0
  HC 1024-1518 bytes packets overflow: 0
  HC 1024-1518 bytes packets: 0
Dell#
```

Example (Brief)

```
Dell#show rmon statistics br
index    ifIndex    interface
----------------------------------------
6001    100974631    TenGigabitEthernet 2/0
6002    100974631    TenGigabitEthernet 2/0
6003    101236775    TenGigabitEthernet 2/1
6004    101236775    TenGigabitEthernet 2/1
9001    134529054    TenGigabitEthernet 3/0
9002    134529054    TenGigabitEthernet 3/0
9003    134791198    TenGigabitEthernet 3/1
9004    134791198    TenGigabitEthernet 3/1
Dell#
```

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Rapid Spanning Tree Protocol (RSTP)

The Dell Networking operating software implementation of rapid spanning tree protocol (RSTP) is based on the IEEE 802.1w standard spanning-tree protocol. The RSTP algorithm configures connectivity throughout a bridged local area network (LAN) that is comprised of LANs interconnected by bridges.

Dell Networking OS supports RSTP on the S6000 platform.

bridge-priority

Set the bridge priority for RSTP.

S6000

Syntax

`bridge-priority priority-value`

To return to the default value, use the `no bridge-priority` command.

Parameters

priority-value	Enter a number as the bridge priority value in increments of 4096. The range is from 0 to 61440. The default is **32768**.

Defaults

32768

Command Modes

CONFIGURATION RSTP (conf-rstp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Related Commands	protocol spanning-tree rstp — enters rapid spanning tree mode.

debug spanning-tree rstp

Enable debugging of RSTP and view information on the protocol.

S6000

Syntax

```
debug spanning-tree rstp [all | bpdu interface {in | out} |
events]
```

To disable debugging, use the `no debug spanning-tree rstp` command.

Parameters

all	(OPTIONAL) Enter the keyword `all` to debug all spanning tree operations.
bpdu *interface* {in | out}	(OPTIONAL) Enter the keyword `bpdu` to debug the bridge protocol data units. (OPTIONAL) Enter the keyword `interface` along with the type slot/port of the interface you want displayed. Type slot/port options are the following: • For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/port information. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. Optionally, enter an in or out parameter with the optional interface: • For Receive, enter `in`. • For Transmit, enter `out`.
events	(OPTIONAL) Enter the keyword `events` to debug RSTP events.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell#debug spanning-tree rstp bpdu gigabitethernet 2/0 ?
in Receive (in)
out Transmit (out)
```

description

Enter a description of the rapid spanning tree.

S6000

Syntax

`description {description}`

To remove the description, use the `no description {description}` command.

Parameters

description	Enter a description to identify the rapid spanning tree (80 characters maximum).

Defaults

none

Command Modes

SPANNING TREE (The prompt is “config-rstp”.)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
pre-7.7.1.0	Introduced.

Related Commands protocol spanning-tree rstp — enters SPANNING TREE mode on the switch.

disable

Disable RSTP globally on the system.

S6000

Syntax `disable`

To enable Rapid Spanning Tree Protocol, use the `no disable` command.

Defaults RSTP is disabled.

Command Modes CONFIGURATION RSTP (conf-rstp)

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Related Commands protocol spanning-tree rstp — enters SPANNING TREE mode on the switch.

forward-delay

Configure the amount of time the interface waits in the Listening State and the Learning State before transitioning to the Forwarding State.

S6000

Syntax

```
forward-delay seconds
```

To return to the default setting, use the `no forward-delay` command.

Parameters

seconds	Enter the number of seconds that FTOS waits before transitioning RSTP to the forwarding state. The range is from 4 to 30. The default is **15 seconds**.

Defaults

15 seconds

Command Modes

CONFIGURATION RSTP (conf-rstp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Related Commands

hello-time — changes the time interval between BPDUs.

max-age — changes the wait time before RSTP refreshes the protocol configuration information.

hello-time

Set the time interval between the generation of the RSTP bridge protocol data units (BPDUs).

S6000

Syntax

`hello-time [milli-second] seconds`

To return to the default value, use the `no hello-time` command.

Parameters

seconds	Enter a number as the time interval between transmission of BPDUs. The range is from 1 to 10 seconds. The default is **2 seconds**.
milli-second	Enter the keywords `milli-second` to configure a hello time on the order of milliseconds. The range is from 50 to 950 milliseconds

Defaults

2 seconds

Command Modes

CONFIGURATION RSTP (conf-rstp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Added the `milli-second` option to the S-Series.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The hello time is encoded in BPDUs in increments of 1/256ths of a second. The standard minimum hello time in seconds is 1 second, which is encoded as 256. Millisecond hello times are encoded using values less than 256; the millisecond hello time equals (x/1000)*256.

When you configure millisecond hellos, the default hello interval of 2 seconds is still used for edge ports; the millisecond hello interval is not used.

Related Commands	forward-delay — changes the wait time before RSTP transitions to the Forwarding state. max-age — changes the wait time before RSTP refreshes the protocol configuration information.

max-age

To maintain configuration information before refreshing that information, set the time interval for the RSTP bridge.

S6000

Syntax

```
max-age seconds
```

To return to the default values, use the `no max-age` command.

Parameters

max-age	Enter a number of seconds the Dell Networking OS waits before refreshing configuration information. The range is from 6 to 40 seconds. The default is **20 seconds**.

Defaults: **20 seconds**

Command Modes: CONFIGURATION RSTP (conf-rstp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Related Commands	forward-delay — changes the wait time before RSTP transitions to the Forwarding state.

hello-time — changes the time interval between BPDUs.

protocol spanning-tree rstp

To configure RSTP, enter RSTP mode.

S6000

Syntax

`protocol spanning-tree rstp`

To exit RSTP mode, use the `exit` command.

Defaults

Not configured

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

RSTP is not enabled when you enter RSTP mode. To enable RSTP globally on the system, use the `no disable` command from RSTP mode.

Example

```
Dell(conf)#protocol spanning-tree rstp
Dell(config-rstp)##no disable
```

Related Commands

disable — disables RSTP globally on the system.

show config

View the current configuration for the mode. Only non-default values are displayed.

S6000

Syntax	`show config`
Command Modes	CONFIGURATION RSTP (conf-rstp)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell(conf-rstp)#show config
!
protocol spanning-tree rstp
  no disable
  bridge-priority 16384
```

show spanning-tree rstp

Display the RSTP configuration.

S6000

Syntax `show spanning-tree rstp [brief] [guard]`

Parameters

brief	(OPTIONAL) Enter the keyword `brief` to view a synopsis of the RSTP configuration information.
guard	(OPTIONAL) Enter the keyword `guard` to display the type of guard enabled on an RSTP interface and the current port state.

Command Modes

- EXEC
- EXEC Privilege

Command History

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.1	Added support for the optional `guard` keyword on the C-Series, S-Series, and E-Series TeraScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.4.1.0	Expanded to display the port error disable state (EDS) caused by loopback BPDU inconsistency.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show spanning-tree rstp guard` command shown in the following example.

Field	Description
Interface Name	RSTP interface.
Instance	RSTP instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), disabled (DIS), or shut down (EDS Shut).
Guard Type	Types of STP guard configured (Root, Loop, or BPDU guard)

Example (Brief)

```
Dell#show spanning-tree rstp brief
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 8192, Address 0001.e805.e306
Root Bridge hello time 4, max age 20, forward delay 15
Bridge ID Priority 16384, Address 0001.e801.6aa8
Configured hello time 2, max age 20, forward delay 15
Interface                             Designated
Name   PortID Prio Cost Sts Cost      Bridge ID      PortID
---------- ------- --- ------- -------------------- --------
Gi 4/0 128.418 128 20000 FWD 20000 16384 0001.e801.6aa8 128.418
Gi 4/1 128.419 128 20000 FWD 20000 16384 0001.e801.6aa8 128.419
Gi 4/8 128.426 128 20000 FWD 20000 8192 0001.e805.e306 128.130
Gi 4/9 128.427 128 20000 BLK 20000 8192 0001.e805.e306 128.131

Interface
Name   Role PortID Prio Cost Sts Cost  Link-type Edge
----------- ---- ------- --- ------- --------- ----
Gi 4/0 Desg 128.418 128 20000 FWD 20000 P2P     Yes
Gi 4/1 Desg 128.419 128 20000 FWD 20000 P2P     Yes
Gi 4/8 Root 128.426 128 20000 FWD 20000 P2P     No
Gi 4/9 Altr 128.427 128 20000 BLK 20000 P2P     No
Dell#
```

Example (EDS, LBK)

NOTE: “LBK_INC” (bold) means Loopback BPDU Inconsistency.

```
Dell#show spanning-tree rstp br
Executing IEEE compatible Spanning Tree Protocol
Root ID Priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15
Bridge ID Priority 32768, Address 0001.e801.6aa8
We are the root
Configured hello time 2, max age 20, forward delay 15

Interface                           Designated
Name   PortID Prio Cost Sts Cost    Bridge ID PortID
- ---- ------- --- ------- -------------------- --------
Gi 0/0 128.257 128 20000 EDS 0 32768 0001.e801.6aa8 128.257
Interface
Name   Role PortID    Prio Cost Sts Cost Link-type Edge
--- ------ -------- ---- ------- --- ------- --------- ----
Gi 0/0 ErrDis 128.257 128 20000 EDS 0 P2P No

Dell#show spanning-tree rstp
Root Identifier has priority 32768, Address 0001.e801.6aa8
Root Bridge hello time 2, max age 20, forward delay 15, max
hops 0
Bridge Identifier has priority 32768, Address 0001.e801.6aa8
Configured hello time 2, max age 20, forward delay 15, max
hops 0
We are the root
Current root has priority 32768, Address 0001.e801.6aa8
Number of topology changes 1, last change occurred 00:00:31
ago on Gi 0/0
```

Port 257 (GigabitEthernet 0/0) is LBK_INC Discarding

```
Port path cost 20000, Port priority 128, Port Identifier
128.257
Designated root has priority 32768, address 0001.e801.6aa8
Designated bridge has priority 32768, address 0001.e801.6aa8
Designated port id is 128.257, designated path cost 0
Number of transitions to forwarding state 1
BPDU : sent 27, received 9
The port is not in the Edge port mode
```

Example (Guard)

```
Dell#show spanning-tree rstp guard
Interface
Name   Instance Sts         Guard type
--------- -------- -------------------
Gi 0/1 0        INCON(Root) Rootguard
Gi 0/2 0        FWD         Loopguard
Gi 0/3 0        BLK         Bpduguard
```

spanning-tree rstp

Configure an RSTP interface with one of these settings: port cost, edge port with optional bridge port data unit (BPDU) guard, port priority, loop guard, or root guard.

S6000

Syntax

```
spanning-tree rstp {cost port-cost | edge-port [bpduguard
[shutdown-on-violation]] | priority priority | {loopguard |
rootguard}}
```

Parameters

cost *port-cost*	Enter the keyword `cost` then the port cost value. The range is from 1 to 200000. The defaults are: • 100 Mb/s Ethernet interface = **200000** • 1-Gigabit Ethernet interface = **20000** • 10-Gigabit Ethernet interface = **2000** • Port Channel interface with one 100 Mb/s Ethernet = **200000** • Port Channel interface with one 1 Gigabit Ethernet = **20000** • Port Channel interface with one 10 Gigabit Ethernet = **2000** • Port Channel with two 1 Gigabit Ethernet = **18000** • Port Channel with two 10 Gigabit Ethernet = **1800** • Port Channel with two 100 Mbps Ethernet = **180000**
edge-port	Enter the keywords `edge-port` to configure the interface as a rapid spanning tree edge port.
bpduguard	(OPTIONAL) Enter the keyword `portfast` to enable Portfast to move the interface into Forwarding mode immediately after the root fails. Enter the keyword `bpduguard` to disable the port when it receives a BPDU.
shutdown-on-violation	(OPTIONAL) Enter the keywords `shutdown-on-violation` to hardware disable an interface when a BPDU is received and the port is disabled.
priority *priority*	Enter keyword `priority` then a value in increments of 16 as the priority. The range is from 0 to 240. The default is **128**.
loopguard	Enter the keyword `loopguard` to enable loop guard on an RSTP port or port-channel interface.
rootguard	Enter the keyword `rootguard` to enable root guard on an RSTP port or port-channel interface.

Defaults Not configured.

Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.1	Added support for the optional `guard` keyword on the C-Series, S-Series, and E-Series TeraScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced the `hardware shutdown-on-violation` options.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Added the optional bridge port data unit (BPDU) guard.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The `BPDU guard` option prevents the port from participating in an active STP topology in case a BPDU appears on a port unintentionally, or is misconfigured, or is subject to a DOS attack. This option places the port into an Error Disable state if a BPDU appears and a message is logged so that the administrator can take corrective action.

NOTE: A port configured as an edge port, on an RSTP switch, immediately transitions to the Forwarding state. Only configure ports connected to end-hosts as edge ports. Consider an edge port similar to a port with a `spanning-tree portfast` enabled.

If you do not enable `shutdown-on-violation`, BPDUs are still sent to the RPM CPU.

You cannot enable STP root guard and loop guard at the same time on a port. For example, if you configure loop guard on a port on which root guard is already configured, the following error message displays: `% Error: RootGuard is configured. Cannot configure LoopGuard`.

Enabling Portfast BPDU guard and loop guard at the same time on a port results in a port that remains in a Blocking state and prevents traffic from flowing through it. For example, when Portfast BPDU guard and loop guard are both configured:

- If a BPDU is received from a remote device, BPDU guard places the port in an Err-Disabled Blocking state and no traffic is forwarded on the port.

- If no BPDU is received from a remote device, loop guard places the port in a Loop-Inconsistent Blocking state and no traffic is forwarded on the port.

Example

```
Dell(conf)#interface gigabitethernet 4/0
Dell(conf-if-gi-4/0)#spanning-tree rstp edge-port
Dell(conf-if-gi-4/0)#show config
!
interface GigabitEthernet 4/0
  no ip address
  switchport
  spanning-tree rstp edge-port
  no shutdown
Dell#
```

tc-flush-standard

Enable the MAC address flushing after receiving every topology change notification.

S6000

Syntax

`tc-flush-standard`

To disable, use the `no tc-flush-standard` command.

Defaults

Disabled

Command Modes

CONFIGURATION (conf-rstp)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced on the E-Series.

Usage Information

By default, Dell Networking OS implements an optimized flush mechanism for RSTP. This implementation helps in flushing MAC addresses only when necessary (and less often), allowing for faster convergence during topology changes. However, if a standards-based flush mechanism is needed, you can turn on this *knob* command to enable flushing MAC addresses after receiving every topology change notification.

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Security

Most of the commands in this chapter are available on the S6000 platform.

This chapter contains various types of security commands offered in the Dell Networking operating software. The commands are listed in the following sections:

- AAA Accounting Commands
- Authorization and Privilege Commands
- Authentication and Password Commands
- RADIUS Commands
- TACACS+ Commands
- Port Authentication (802.1X) Commands
- SSH Server and SCP Commands
- Secure DHCP Commands

For configuration details, refer to the Security chapter in the *Dell Networking OS` Configuration Guide*.

NOTE: Dell Networking OS implements LEAP with MSCHAP v2 supplicant.

AAA Accounting Commands

AAA Accounting enables tracking of services that users are accessing and the amount of network resources being consumed by those services. When you enable AAA Accounting, the network server reports user activity to the TACACS+ security server in the form of accounting records. Each accounting record is comprised of accounting AV pairs and is stored on the access control server.

As with authentication and authorization, you must configure AAA Accounting by defining a named list of accounting methods, and then applying that list to various interfaces.

aaa accounting

Enable AAA Accounting and create a record for monitoring the accounting function.

S6000

Syntax	`aaa accounting {system	exec	commands level	role role-name} {name	default}{start-stop	wait-start	stop-only} {tacacs+}` To disable AAA Accounting, use the `no aaa accounting {system	exec	command level} {name	default}{start-stop	wait-start	stop-only} {tacacs+}` command.

Parameters

system	Enter the keyword `system` to send accounting information of any other AAA configuration.
exec	Enter the keyword `exec` to send accounting information when a user has logged in to EXEC mode.
commands {*level* | role *role-name*	Enter the keyword `command` then a privilege level for accounting of commands executed at that privilege level or enter the keyword `role` then the role name for accounting of commands executed by a user with that user role.
name | default	Enter one of the following: • For `name`, enter a user-defined name of a list of accounting methods. • For `default`, the default accounting methods used.
start-stop	Enter the keywords `start-stop` to send a “start accounting” notice at the beginning of the requested event and a “stop accounting” notice at the end of the event.
wait-start	Enter the keywords `wait-start` to ensure that the TACACS + security server acknowledges the start notice before granting the user’s process request.
stop-only	Enter the keywords `stop-only` to instruct the TACACS+ security server to send a “stop record accounting” notice at the end of the requested user process.
tacacs+	Enter the keyword `tacacs+` to use TACACS+ data for accounting. The Dell Networking OS currently only supports TACACS+ accounting.

Defaults none

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, and MXL
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced on the E-Series.

Usage Information

In the example above, TACACS+ accounting is used to track all usage of EXEC command and commands on privilege level 15.

Privilege level 15 is the default. If you want to track usage at privilege level 1 for example, use the `aaa accounting command 1` command.

Example

```
Dell(conf)# aaa accounting exec default start-stop tacacs+
Dell(conf)# aaa accounting command 15 default start-stop tacacs
+
Dell(conf)# aaa accounting command role secaadmin default
start-stop tacacs+
```

Related Commands

enable password — changes the password for the `enable` command.

login authentication — enables AAA login authentication on the terminal lines.

password — creates a password.

tacacs-server host — specifies a TACACS+ server host.

aaa accounting suppress

Prevent the generation of accounting records of users with the user name value of NULL.

S6000

Syntax

`aaa accounting suppress null-username`

To permit accounting records to users with user name value of NULL, use the `no aaa accounting suppress null-username` command.

Defaults

Accounting records are recorded for all users.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4280T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced on the E-Series.

Usage Information

Dell Networking OS issues accounting records for all users on the system, including users whose username string, due to protocol translation, is NULL. For example, a user who comes on line with the `aaa authentication login` *`method-list`* `none` command is applied. To prevent the accounting records from being generated for sessions that do not have user names associated to them, use the `aaa accounting suppress` command.

accounting

Apply an accounting method list to terminal lines.

S6000

Syntax

`accounting {exec | commands {level | role` *`role-name`*`}` *`method-list`*

Parameters

exec	Enter the keyword `exec` to apply an EXEC level accounting method list.
commands {*level* | role *role-name*}	Enter the keywords `commands level` to apply an EXEC and CONFIGURATION level accounting method list by enter the keyword `role` and then the role name for accounting of commands executed by a user with that user role.
method-list	Enter a method list that you defined using the `aaa accounting exec` or `aaa accounting` commands.

Defaults

none

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced on the E-Series.

Related Commands

aaa accounting — enables AAA Accounting and creates a record for monitoring the accounting function.

aaa radius group

Configure the RADIUS server group that is used for Authentication, Authorization and Accounting.

Syntax

`aaa radius group` *`group-name`*

To remove the RADIUS group configuration, use the `no aaa radius group` *`group-name`* command.

Parameters

group-name	Enter the name of the RADIUS server group.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

You can use this command to configure the group of Radius servers used for Authentication, Authorization, and Accounting purposes.

If the RADIUS group is not configured for Authentication, Authorization, and Accounting, then globally configured Radius servers are used for the purposes.

When the RADIUS group is removed, the AAA configuration is also removed.

Example

```
Dell(conf)#radius-server group group1
Dell(conf-radius-group)#radius-server host 1.1.1.1 key secret
Dell(conf-radius-group)#radius-server host 2.2.2.2 key secret
Dell(conf-radius-group)#radius-server vrf vrf1 source-
```

```
interface tengigabitethernet 0/36
Dell(conf)#exit
Dell(conf)#aaa radius group group1
```

show accounting

Display the active accounting sessions for each online user.

S6000

Syntax `show accounting`

Defaults none

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced on the E-Series.

Usage Information

This command steps through all active sessions and then displays the accounting records for the active account functions.

Example

```
Dell#show accounting
Active accounted actions on tty2, User admin Priv 1 Role
   Task ID 2, EXEC Accounting record, 00:02:03 Elapsed,
service=shell
Active accounted actions on tty3, User ad Priv 15 Role
   Task ID 7, EXEC Accounting record, 00:01:22 Elapsed,
service=shell
Active accounted actions on tty4, User ad Priv 15 Role
   Task ID 11, EXEC Accounting record, 00:00:35 Elapsed,
service=shell
Active accounted actions on tty5, User ad1 Priv 1 Role sysadmin
   Task ID 16, EXEC Accounting record, 00:00:04 Elapsed,
service=shell
Dell#
```

Related Commands

aaa accounting — enables AAA Accounting and creates a record for monitoring the accounting function.

Authorization and Privilege Commands

To set command line authorization and privilege levels, use the following commands.

authorization

Apply an authorization method list to terminal lines.

S6000

Syntax

```
authorization {exec | commands {level | role role-name}}
method-list
```

Parameters

exec	Enter the keyword `exec` to apply an EXEC level authorization method list.
commands {*level* | role *role-name*}	Enter the keyword commands followed by either a privilege level for accounting of commands executed at that privilege level, or enter the keyword `role` then the role name for authorization of commands executed by a user with that user role.
method-list	Enter a method list that you defined using the `aaa accounting exec` or `aaa accounting` commands.

Defaults

none

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, and MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced on the E-Series.

Related Commands	aaa authorization commands — sets the parameters that restrict (or permit) a user's access to EXEC and CONFIGURATION level commands aaa authorization exec — sets the parameters that restrict (or permit) a user's access to EXEC level commands.

aaa authorization commands

Set parameters that restrict (or permit) a user's access to EXEC and CONFIGURATION level commands.

S6000

Syntax

```
aaa authorization commands {level | role role-name}{name|
default} {local | tacacs+| none}
```

Undo a configuration with the `no aaa authorization commands {level | role role-name} {name|default} {local | tacacs+ | none}` command.

Parameters

commands *level*	Enter the keyword `commands` then the command privilege level for command level authorization.
role *role-name*	Enter the keyword `role` then the role name.
name	Define a name for the list of authorization methods.
default	Define the default list of authorization methods.
local	Use the authorization parameters on the system to perform authorization.
tacacs+	Use the TACACS+ protocol to perform authorization.
none	Enter the keyword `none` to apply no authorization.

Defaults: none

Command Modes: CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Added support for RADIUS.

aaa authorization config-commands

Set parameters that restrict (or permit) a user's access to EXEC level commands.

S6000

Syntax

`aaa authorization config-commands`

Disable authorization checking for CONFIGURATION level commands using the `no aaa authorization config-commands` command.

Defaults

Enabled when you configure `aaa authorization commands` command.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the E-Series.

Usage Information

By default, the `aaa authorization commands` command configures the system to check both EXEC level and CONFIGURATION level commands. Use the command `no aaa authorization config-commands` to enable only EXEC-level command checking.

aaa authorization exec

Set parameters that restrict (or permit) a user's access to EXEC-level commands.

S6000

Syntax

`aaa authorization exec {name | default} {local || tacacs+ || if-authenticated || none}`

To disable authorization checking for EXEC level commands, use the `no aaa authorization exec` command.

Parameters

name	Define a name for the list of authorization methods.
default	Define the default list of authorization methods.
local	Use the authorization parameters on the system to perform authorization.
tacacs+	Use the TACACS+ protocol to perform authorization.
none	Enter the keyword `none` to apply no authorization.

Defaults none

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.1.1.0	Added support for RADIUS.

privilege level (CONFIGURATION mode)

Change the access or privilege level of one or more commands.

S6000

Syntax

`privilege mode {level level command | reset command}`

To delete access to a level and command, use the `no privilege mode level level command` command.

Parameters

mode	Enter one of the following keywords as the mode for which you are controlling access: • `configure` for CONFIGURATION mode • `exec` for EXEC mode • `interface` for INTERFACE modes • `line` for LINE mode • `route-map` for ROUTE-MAP mode • `router` for ROUTER OSPF, ROUTER RIP, ROUTER ISIS and ROUTER BGP modes
level *level*	Enter the keyword `level` then a number for the access level. The range is from 0 to 15. Level 1 is EXEC mode and Level 15 allows access to all CLI modes and commands.
reset	Enter the keyword `reset` to return the security level to the default setting.
command	Enter the command's keywords to assign the command to a certain access level. You can enter one or all of the keywords.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information To define a password for the level to which you are assigning privilege or access, use the `enable password` command.

privilege level (LINE mode)

Change the access level for users on the terminal lines.

S6000

Syntax `privilege level` *`level`*

To delete access to a terminal line, use the `no privilege level` *`level`* command.

Parameters

level *level*	Enter the keyword `level` then a number for the access level. The range is from 0 to 15. Level 1 is EXEC mode and Level 15 allows access to all CLI modes.

Defaults *level* = **15**

Command Modes LINE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Authentication and Password Commands

To manage access to the system, use the following the commands.

aaa authentication enable

Configure AAA Authentication method lists for user access to EXEC privilege mode (the “Enable” access).

S6000

Syntax

`aaa authentication enable {default | method-list-name} method [... method2]`

To return to the default setting, use the `no aaa authentication enable {default | method-list-name} method [... method2]` command.

Parameters

default	Enter the keyword `default` then the authentication methods to use as the default sequence of methods for the Enable login. The default is `default enable`.
method-list-name	Enter a text string (up to 16 characters long) to name the list of enabled authentication methods activated at login.
method	Enter one of the following methods: • `enable`: use the password the `enable password` command defines in CONFIGURATION mode. • `line`: use the password the `password` command defines in LINE mode. • `none`: no authentication. • `radius`: use the RADIUS servers configured with the `radius-server host` command. • `tacacs+`: use the TACACS+ server(s) configured with the `tacacs-server host` command.
... method2	(OPTIONAL) In the event of a “no response” from the first method, Dell Networking OS applies the next configured method.

Defaults

Use the `enable` password.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.0	Introduced on the E-Series.

Usage Information

By default, the `Enable password` is used. If you configure `aaa authentication enable default`, Dell Networking OS uses the methods defined for `Enable access` instead.

Methods configured with the `aaa authentication enable` command are evaluated in the order they are configured. If authentication fails using the primary method, Dell Networking OS employs the second method (or third method, if necessary) automatically. For example, if the TACACS+ server is reachable, but the server key is invalid, Dell Networking OS proceeds to the next authentication method. The TACACS+ is incorrect, but the user is still authenticated by the secondary method.

Related Commands

enable password — changes the password for the `enable` command.

login authentication — enables AAA login authentication on the terminal lines.

password — creates a password.

radius-server host — specifies a RADIUS server host.

tacacs-server host — specifies a TACACS+ server host.

aaa authentication login

Configure AAA Authentication method lists for user access to EXEC mode (`Enable log-in`).

S6000

Syntax

`aaa authentication login {`*`method-list-name`*` | default} `*`method`*` [... `*`method4`*`]`

To return to the default setting, use the `no aaa authentication login {`*`method-list-name`*` | default}` command.

Parameters

method-list-name	Enter a text string (up to 16 characters long) as the name of a user-configured method list that can be applied to different lines.
default	Enter the keyword `default` to specify that the method list specified is the default method for all terminal lines.
method	Enter one of the following methods:

- `enable`: use the password the `enable password` command defines in CONFIGURATION mode. Not available if role-only is in use.
- `line`: use the password the `password` command defines in LINE mode. Not available if role-only is in use.
- `local`: use the password for the userid contained in the local password database.
- `none`: no authentication. Not available if role-only is in use.
- `radius`: use the RADIUS servers configured with the `radius-server host` command.
- `tacacs+`: use the TACACS+ servers configured with the `tacacs-server host` command.

... method4	(OPTIONAL) Enter up to four additional methods. In the event of a “no response” from the first method, the system applies the next configured method (up to four configured methods).

Defaults Not configured (that is, no authentication is performed).

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

By default, the locally configured username password is used. If you configure `aaa authentication login default`, Dell Networking OS uses the methods this command defines for login instead.

Methods configured with the `aaa authentication login` command are evaluated in the order they are configured. If users encounter an error with the first method listed, Dell Networking OS applies the next method configured. If users fail the first method listed, no other methods are applied. The only exception is the local method. If the user's name is not listed in the local database, the next method is applied. If the correct user name/password combination is not entered, the user is not allowed access to the switch.

NOTE: If authentication fails using the primary method, Dell Networking OS employs the second method (or third method, if necessary) automatically. For example, if the TACACS+ server is reachable, but the server key is invalid, Dell Networking OS proceeds to the next authentication method. The TACACS+ is incorrect, but the user is still authenticated by the secondary method.

After configuring the `aaa authentication login` command, configure the `login authentication` command to enable the authentication scheme on terminal lines.

Connections to the SSH server work with the following login mechanisms: local, radius, and tacacs.

Related Commands	login authentication — enables AAA login authentication on the terminal lines. password — creates a password. radius-server host — specifies a RADIUS server host. tacacs-server host — specifies a TACACS+ server host.

access-class

Restrict incoming connections to a particular IP address in a defined IP access control list (ACL).

S6000

Syntax

`access-class access-list-name`

To delete a setting, use the `no access-class` command.

Parameters

access-list-name	Enter the name of an established IP Standard ACL.

Defaults: Not configured.

Command Modes: LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

line — applies an authentication method list to the designated terminal lines.

ip access-list standard — names (or selects) a standard access list to filter based on the IP address.

ip access-list extended — names (or selects) an extended access list based on the IP addresses or protocols.

enable password

Change the password for the `enable` command.

S6000

Syntax

```
enable password [level level] [encryption-type] password
```

To delete a password, use the `no enable password [encryption-type] password [level level]` command.

Parameters

level *level*	(OPTIONAL) Enter the keyword `level` then a number as the level of access. The range is from 1 to 15.
encryption-type	(OPTIONAL) Enter the number `7` or `0` as the encryption type. Enter a `7` then a text string as the hidden password. The text string must be a password that was already encrypted by a Dell Networking router. Use this parameter only with a password that you copied from the `show running-config` file of another Dell Networking router.
password	Enter a text string, up to 32 characters long, as the clear text password.

Defaults

No password is configured. *level* = **15**.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

To control access to command modes, use this command to define a password for a level and use the `privilege level (CONFIGURATION mode)` command.

Passwords must meet the following criteria:

- Start with a letter, not a number.
- Passwords can have a regular expression as the password. To create a password with a regular expression in it, use CNTL + v prior to entering regular expression. For example, to create the password `abcd]e`, you type "`abcd CNTL v ]e`". When the password is created, you do not use the CNTL + v key combination and enter "`abcd]e`".

NOTE: The question mark (?) and the tilde (~) are not supported characters.

Related Commands

show running-config — views the current configuration.

privilege level (CONFIGURATION mode) — controls access to the command modes within the switch.

enable restricted

Allows Dell Networking technical support to access restricted commands.

S6000

Syntax

```
enable restricted [encryption-type] password
```

To disallow access to restricted commands, use the `no enable restricted` command.

Parameters

encryption-type	(OPTIONAL) Enter the number `7` as the encryption type. Enter `7` followed a text string as the hidden password. The text string must be a password that was already encrypted by a Dell Networking router. Use this parameter only with a password that you copied from the `show running-config` file of another Dell Networking router.
password	Enter a text string, up to 32 characters long, as the clear text password.

Defaults

Not configured.

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Only Dell Networking Technical Support staff use this command.

enable secret

Change the password for the `enable` command.

S6000

Syntax

```
enable secret [level level] [encryption-type] password
```

To delete a password, use the `no enable secret [encryption-type] password [level level]` command.

Parameters

level *level*	(OPTIONAL) Enter the keyword `level` then a number as the level of access. The range is from 1 to 15.

encryption-type	(OPTIONAL) Enter the number `5` or `0` as the encryption type. Enter a `5` then a text string as the hidden password. The text string must be a password that was already encrypted by a Dell Networking router. Use this parameter only with a password that you copied from the `show running-config` file of another Dell Networking router.
password	Enter a text string, up to 32 characters long, as the clear text password.

Defaults No password is configured. *level* = **15**.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information To control access to command modes, use this command to define a password for a level and use the `privilege level (CONFIGURATION mode)` command.

Passwords must meet the following criteria:

- Start with a letter, not a number.
- Passwords can have a regular expression as the password. To create a password with a regular expression in it, use CNTL + v prior to entering regular expression. For example, to create the password `abcd]e`, you type "`abcd CNTL v ]e`". When the password is created, you do not use the CNTL + v key combination and enter "`abcd]e`".

NOTE: The question mark (?) and the tilde (~) are not supported characters.

Related Commands	show running-config — views the current configuration. privilege level (CONFIGURATION mode) — controls access to the command modes within the switch.

login authentication

To designate the terminal lines, apply an authentication method list.

S6000

Syntax

`login authentication {method-list-name | default}`

To use the local user/password database for login authentication, use the `no login authentication` command.

Parameters

method-list-name	Enter the keywords `method-list-name` to specify that method list, created in the `aaa authentication login` command, to be applied to the designated terminal line.
default	Enter the keyword `default` to specify that the default method list, created in the `aaa authentication login` command, is applied to the terminal line.

Defaults

No authentication is performed on the console lines. Local authentication is performed on the virtual terminal and auxiliary lines.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

If you configure the `aaa authentication login default` command, the `login authentication default` command automatically is applied to all terminal lines.

Related Commands	[aaa authentication login]() — selects the login authentication methods.

password

Specify a password for users on terminal lines.

S6000

Syntax

`password [encryption-type] password`

To delete a password, use the `no password password` command.

Parameters

encryption-type	(OPTIONAL) Enter either zero (`0`) or `7` as the encryption type for the password entered. The options are • `0` is the default and means the password is not encrypted and stored as clear text. • `7` means that the password is encrypted and hidden.
password	Enter a text string up to 32 characters long. The first character of the password must be a letter. You cannot use spaces in the password.

Defaults

No password is configured.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Dell Networking OS prompts users for these passwords when the method for authentication or authorization used is "line".

Related Commands

enable password — sets the password for the `enable` command.

login authentication — configures an authentication method to log in to the switch.

service password-encryption — encrypts all passwords configured in Dell Networking OS .

radius-server key — configures a key for all RADIUS communications between the switch and the RADIUS host server.

tacacs-server key — configures a key for communication between a TACACS+ server and client.

username — establishes an authentication system based on user names.

password-attributes

Configure the password attributes (strong password).

S6000

Syntax

```
password-attributes [min-length number] [max-retry number]
[lockout-period minutes][character-restriction [upper number]
[lower number] [numeric number] [special-char number]]
```

To return to the default, use the `no password-attributes [min-length number] [max-retry number] [lockout-period minutes] [character-restriction [upper number] [lower number] [numeric number] [special-char number]]` command.

Parameters

min-length *number*	(OPTIONAL) Enter the keywords `min-length` then the number of characters. The range is from 0 to 32 characters.
max-retry *number*	(OPTIONAL) Enter the keywords `max-retry` then the number of maximum password retries. The range is from 0 to 16.
lockout-period *minutes*	(OPTIONAL) Enter the keyword `lockout-period` then the number of minutes. The range is from `1` to `1440` minutes. The default is `0` minutes and the lockout-period is not enabled. This parameter enhances the security of the switch by locking out sessions on the Telnet or SSH sessions for which there has been a consecutive failed login attempts. The console is not locked out.
character-restriction	(OPTIONAL) Enter the keywords `character-restriction` to indicate a character restriction for the password.
upper *number*	(OPTIONAL) Enter the keyword `upper` then the upper number. The range is from 0 to 31.

lower *number*	(OPTIONAL) Enter the keyword `lower` then the lower number. The range is from 0 to 31.
numeric *number*	(OPTIONAL) Enter the keyword `numeric` then the numeric number. The range is from 0 to 31.
special-char *number*	(OPTIONAL) Enter the keywords `special-char` then the number of special characters permitted. The range is from 0 to 31.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Introduced `lockout-period` option on the Z9000, S6000, S4820T, S4810, and MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.3.1.0	Introduced on the E-Series.

Related Commands

password — specifies a password for users on terminal lines.

service password-encryption

Encrypt all passwords configured in Dell Networking OS.

S6000

Syntax

```
service password-encryption
```

To store new passwords as clear text, use the `no service password-encryption` command.

Defaults

Enabled.

Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

⚠ **CAUTION: Encrypting passwords with this command does not provide a high level of security. When the passwords are encrypted, you cannot return them to plain text unless you re-configure them. To remove an encrypted password, use the `no password password` command.**

To keep unauthorized people from viewing passwords in the switch configuration file, use the `service password-encryption` command. This command encrypts the clear-text passwords created for user name passwords, authentication key passwords, the privileged command password, and console and virtual terminal line access passwords.

To view passwords, use the `show running-config` command.

show privilege

View your access level.

S6000

Syntax

```
show privilege
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show privilege
Current privilege level is 15.
Dell#

Dell#show privilege
Current privilege level is 14.
Dell#
Dell#show privilege
Current privilege level is 10.
Dell#
```

Related Commands

privilege level (CONFIGURATION mode) — assigns access control to different command modes.

show users

Allows you to view information on all users logged in to the switch.

S6000

Syntax

```
show users [all]
```

Parameters

all	(OPTIONAL) Enter the keyword `all` to view all terminal lines in the switch.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show user` command shown in the following example.

Field	Description
(untitled)	Indicates with an asterisk (*) which terminal line you are using.
Line	Displays the terminal lines currently in use.
User	Displays the user name of all users logged in.
Host(s)	Displays the terminal line status.
Location	Displays the IP address of the user.

Example

```
Dell# show users
Authorization Mode:  role or privilege
    Line              User
Role             Priv Host(s)    Location
*   0  console 0
unassigned         1  idle
    2  vty 0              admin
unassigned         1  idle       10.16.127.35
    3  vty 1              ad
unassigned        15  idle       10.16.127.145
    4  vty 2              ad1
sysadmin           1    idle       10.16.127.141
    5  vty 3              ad1
sysadmin           1    idle       10.16.127.145
    6  vty 4              admin
unassigned         1  idle       10.16.127.141
    7  vty 5              ad
unassigned        15  idle       10.16.127.141
Dell#
```

Related Commands

username — enables a user.

timeout login response

Specify how long the software waits for the login input (for example, the user name and password) before timing out.

S6000

Syntax

`timeout login response seconds`

To return to the default values, use the `no timeout login response` command.

Parameters

seconds	Enter a number of seconds the software waits before logging you out. The range is: • VTY: the range is from 1 to 30 seconds, the default is **30 seconds**. • Console: the range is from 1 to 300 seconds, the default is **0 seconds** (no timeout). • AUX: the range is from 1 to 300 seconds, the default is **0 seconds** (no timeout).

Defaults

See the defaults settings shown in *Parameters*.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The software measures the period of inactivity defined in this command as the period between consecutive keystrokes. For example, if your password is “password” you can enter “p” and wait 29 seconds to enter the next letter.

username

Establish an authentication system based on user names.

S6000

Syntax

```
username name [access-class access-list-name] [nopassword |
{password | secret} [encryption-type] password] [privilege
level] [role role-name]
```

If you do not want a specific user to enter a password, use the `nopassword` option.

To delete authentication for a user, use the `no username name` command.

Parameters

name	Enter a text string for the name of the user up to 63 characters.
access-class *access-list-name*	Enter the keywords `access-class` then the name of a configured access control list (either an IP access control list or MAC access control list).
nopassword	Enter the keyword `nopassword` to specify that the user should not enter a password.
password	Enter the keyword `password` then the `encryption-type` or the password.
secret	Enter the keyword `secret` then the `encryption-type` or the password.
encryption-type	Enter an encryption type for the `password` that you enter. • `0` directs the system to store the password as clear text. It is the default encryption type when using the `password` option. • `7` to indicate that a password encrypted using a DES hashing algorithm follows. This encryption type is available with the `password` option only. • `5` to indicate that a password encrypted using an MD5 hashing algorithm follows. This encryption type is available with the `secret` option only, and is the default encryption type for this option.
password	Enter a string up to 32 characters long.
privilege *level*	Enter the keyword `privilege` then a number from zero (0) to 15.
role *role-name*	Enter the keyword `role` followed by the role name to associate with that user ID.
secret	Enter the keyword `secret` then the encryption type.

Defaults

The default encryption type for the `password` option is **0**. The default encryption type for the `secret` option is **0**.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for roles on the Z9000, S6000, S4820T, S4810, MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Added support for the `secret` option and the MD5 password encryption. Extended the name from 25 to 63 characters.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

To view the defined user names, use the `show running-config user` command.

Related Commands

password — specifies a password for users on terminal lines.

show running-config — views the current configuration.

RADIUS Commands

The following RADIUS commands are supported by Dell Networking OS.

debug radius

View RADIUS transactions to assist with troubleshooting.

S6000

Syntax	`debug radius` To disable debugging of RADIUS, use the `no debug radius` command.
Defaults	Disabled.
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

ip radius source-interface

Specify an interface's IP address as the source IP address for RADIUS connections.

S6000

Syntax	`ip radius source-interface` *`interface`* To delete a source interface, use the `no ip radius source-interface` command.
Parameters	

interface	Enter the following keywords and slot/port or number information: • For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.

- For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16838.
- For the Null interface, enter the keywords `null 0`.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

radius-server deadtime

Configure a time interval during which non-responsive RADIUS servers to authentication requests are skipped.

S6000

Syntax

`radius-server deadtime` *`seconds`*

To disable this function or return to the default value, use the `no radius-server deadtime` command.

Parameters

seconds	Enter a number of seconds during which non-responsive RADIUS servers are skipped. The range is from 0 to 2147483647 seconds. The default is **0 seconds**.

Defaults **0 seconds**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

radius-server group

Creates or deletes a group of radius servers.

Syntax `radius-server group group-name`

Parameters

group-name	Enter the group name that denotes the group of RADIUS servers.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Example

```
FTOS(conf)#radius-server group group1
FTOS(conf-radius-group)#radius-server host 1.1.1.1 key secret
FTOS(conf-radius-group)#radius-server host 2.2.2.2 key secret
FTOS(conf-radius-group)#radius-server vrf vrf1 source-
interface tengigabitethernet 0/36
FTOS(conf-radius-group)#show config
!
radius-server group group1
radius-server vrf vrf1 source-interface TenGigabitEthernet
0/36
radius-server host 1.1.1.1 key 7 9a2f3ec0c65c6f41
radius-server host 2.2.2.2 key 7 9a2f3ec0c65c6f41
FTOS(conf-radius-group)#
```

Related Commands

login authentication — sets the database to be checked when a user logs in.

radius-server key — sets an authentication key for RADIUS communications.

radius-server retransmit — sets the number of times the RADIUS server attempts to send information.

radius-server timeout — sets the time interval before the RADIUS server times out.

radius-server host

Configure a RADIUS server host.

S6000

Syntax

`radius-server host {`*`hostname`*` | `*`ipv4-address`*` | `*`ipv6-address`*`} [auth-port `*`port-number`*`] [retransmit `*`retries`*`] [timeout `*`seconds`*`] [key [`*`encryption-type`*`] `*`key`*`]`

Parameters

hostname	Enter the name of the RADIUS server host.
ipv4-address | *ipv6-address*	Enter the IPv4 address (A.B.C.D) or IPv6 address (X:X:X:X::X) of the RADIUS server host.
auth-port *port-number*	(OPTIONAL) Enter the keywords `auth-port` then a number as the port number. The range is from zero (0) to 65535. The default port-number is **1812**.
retransmit *retries*	(OPTIONAL) Enter the keyword `retransmit` then a number as the number of attempts. This parameter overwrites the `radius-server retransmit` command. The range is from zero (0) to 100. The default is **3 attempts**.
timeout *seconds*	(OPTIONAL) Enter the keyword `timeout` then the seconds the time interval the switch waits for a reply from the RADIUS server. This parameter overwrites the `radius-server timeout` command. The range is from 0 to 1000. The default is **5 seconds**.

key [*encryption-type*] *key*	(OPTIONAL) Enter the keyword `key` then an optional encryption-type and a string up to 42 characters long as the authentication key. The RADIUS host server uses this authentication key and the RADIUS daemon operating on this switch. For the encryption-type, enter either zero (`0`) or `7` as the encryption type for the key entered. The options are: • `0` is the default and means the password is not encrypted and stored as clear text. • `7` means that the password is encrypted and hidden. Configure this parameter last because leading spaces are ignored.

Defaults Not configured.

Command Modes

- RADIUS SERVER GROUP
- CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.1.0	Added support for IPv6.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Authentication key length increased to 42 characters.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

To configure any number of RADIUS server hosts for each server host that is configured, use this command. Dell Networking OS searches for the RADIUS hosts in the order they are configured in the software.

The global default values for the `timeout`, `retransmit`, and `key` optional parameters are applied, unless those values are specified in the `radius-server host` or other commands. To return to the global default values, if you configure the `timeout`, `retransmit`, or `key` values, include those keywords when using the `no radius-server host` command syntax.

You can use duplicate host names or IP addresses among RADIUS groups. However, you cannot use duplicate host names or IP addresses within the same RADIUS group. If a VRF is not configured on the RADIUS group, then servers configured in the group are considered to be on the default VRF. RADIUS servers that are configured in the CONFIGURATION mode are also considered to be on the default VRF.

You must configure the RADIUS group explicitly with the `aaa radius group` command in order for the AAA servers to use the group of RADIUS servers. The 802.1x servers use the group of RADIUS servers based on the VRF where the 802.1x request is received. As a result, it is possible that both globally configured RADIUS servers as well as the group-configured RADIUS servers (without VRF or default VRF) are used for processing the 802.1x requests that are received at the default VRF. The order in which the RADIUS servers are tried depends on the order in which the RADIUS servers are configured.

Example

```
Dell(conf)#radius-server group group1
Dell(conf-radius-group)#radius-server host 1.1.1.1 key secret
Dell(conf-radius-group)#no radius-server host 1.1.1.1
```

Related Commands

login authentication — sets the database to be checked when a user logs in.

radius-server key — sets an authentication key for RADIUS communications.

radius-server retransmit — sets the number of times the RADIUS server attempts to send information.

radius-server timeout — sets the time interval before the RADIUS server times out.

radius-server vrf

Create an association between a RADIUS server group and a VRF and source interface..

Syntax

`radius-server vrf vrf-name [source-interface *interface*]`

To delete the association between a RADIUS server group and a VRF and source interface, use the `no radius-server vrf vrf-name [source-interface` *`interface`*`]` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to associate a RADIUS server group with that VRF.
interface	Enter the following keywords and slot/port or number information: • For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.

- For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
- For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16838.
- For the Null interface, enter the keywords `null 0`.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults	Not configured.
Command Modes	RADIUS SERVER GROUP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

You can use this command to associate a group of RADIUS servers with a VRF and source interface. You can configure the source interface only with the VRF attribute and source interface is optional with the VRF attributes.

If VRF is not configured on the RADIUS group, then the group is considered to be on the default VRF. It is possible to use the default VRF name; however, you cannot configure the source interface with the default VRF as such a configuration results in conflicts between the source interfaces corresponding to the 802.1x supplicants on that default VRF.

RADIUS groups and VRFs have one-to-one mapping. If a VRF is configured with one RADIUS group, then you cannot use the same VRF with another RADIUS group. When the VRF is removed, then the corresponding RADIUS group is also removed automatically.

Example

```
Dell(conf)#radius-server group group1
Dell(conf-radius-group)#radius-server vrf vrf1 source-
interface tengigabitethernet 0/36

Dell(conf)#radius-server group group2
Dell(conf-radius-group)#radius-server vrf default
```

radius-server key

Configure a key for all RADIUS communications between the switch and the RADIUS host server.

S6000

Syntax

`radius-server key [encryption-type] key`

To delete a password, use the `no radius-server key` command.

Parameters

encryption-type	(OPTIONAL) Enter either zero (`0`) or `7` as the encryption type for the key entered. The options are: • `0` is the default and means the key is not encrypted and stored as clear text. • `7` means that the key is encrypted and hidden.
key	Enter a string that is the key to be exchanged between the switch and RADIUS servers. It can be up to 42 characters long.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Authentication key length increased to 42 characters.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Usage Information

The key configured on the switch must match the key configured on the RADIUS server daemon.

If you configure the `key` parameter in the `radius-server host` command, the key configured with the `radius-server key` command is the default key for all RADIUS communications.

Related Commands

radius-server host — configures a RADIUS host.

radius-server retransmit

Configure the number of times the switch attempts to connect with the configured RADIUS host server before declaring the RADIUS host server unreachable.

S6000

Syntax

`radius-server retransmit retries`

To configure zero retransmit attempts, use the `no radius-server retransmit` command.

To return to the default setting, use the `radius-server retransmit 3` command.

Parameters

retries	Enter a number of attempts that FTOS tries to locate a RADIUS server. The range is from zero (0) to 100. The default is **3 retries**.

Defaults

3 retries

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Related Commands

radius-server host — configures a RADIUS host.

radius-server timeout

To reply to a request, configure the amount of time the RADIUS client (the switch) waits for a RADIUS host server .

S6000

Syntax	`radius-server timeout seconds` To return to the default value, use the `no radius-server timeout` command.
Parameters	*seconds* — Enter the number of seconds between an unsuccessful attempt and the Dell Networking OS times out. The range is from zero (0) to 1000 seconds. The default is **5 seconds**.
Defaults	**5 seconds**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

Related Commands: radius-server host — configures a RADIUS host.

TACACS+ Commands

Dell Networking OS supports TACACS+ as an alternate method for login authentication.

tacacs-server group

Creates a group of TACACS servers to be used for Authentication, Authorization, and Accounting..

Syntax	`aaa tacacsgroup group-name` To delete a group of TACACS servers, use the `no tacacs-server group group-name` command.
Parameters	*group-name* — Enter the name of the TACACS server group.
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command. Version 9.4.(0.0) — Introduced on the S-Series and Z-Series.
Usage Information	If the TACACS group is not configured for Authentication, Authorization, and Accounting, then globally configured TACACS servers are used for the purposes. When the TACACS group is removed, the AAA configuration is also removed.

Example

```
Dell(conf)#tacacs-server group group1
Dell(conf-tacacs-group)#tacacs-server host 1.1.1.1 key secret
Dell(conf-tacacs-group)#tacacs-server host 2.2.2.2 key secret
Dell(conf-tacacs-group)#tacacs-server vrf vrf1 source-
interface tengigabitethernet 0/36
Dell(conf)#exit
Dell(conf)#aaa tacacsgroup group1
```

Related Commands

aaa authentication login — specifies the login authentication method.

tacacs-server key — configures a TACACS+ key for the TACACS server.

debug tacacs+

To assist with troubleshooting, view TACACS+ transactions.

S6000

Syntax

`debug tacacs+`

To disable debugging of TACACS+, use the `no debug tacacs+` command.

Defaults	Disabled.
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.0	Introduced on the E-Series.

ip tacacs source-interface

Specify an interface's IP address as the source IP address for TACACS+ connections.

S6000

Syntax

`ip tacacs source-interface` *`interface`*

To delete a source interface, use the `no ip tacacs source-interface` command.

Parameters

interface — Enter the following keywords and slot/port or number information:

- For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
- For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
- For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16838.
- For the Null interface, enter the keywords `null 0`.
- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

- For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

tacacs-server group

Creates a group of TACACS servers.

Syntax `tacacs-server group group-name`

To delete a group of TACACS servers, use the `no tacacs-server group group-name` command.

Parameters

group-name	Enter the name of the TACACS server group.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

You can associate a TACACS server group with a VRF.

Example

```
Dell(conf)#tacacs-server group group1
Dell(conf-tacacs-group)#tacacs-server host 1.1.1.1 key secret
Dell(conf-tacacs-group)#tacacs-server host 2.2.2.2 key secret
Dell(conf-tacacs-group)#tacacs-server vrf vrf1 source-
interface tengigabitethernet 0/36
Dell(conf-tacacs-group)#show config
!
tacacs-server group group1
tacacs-server vrf vrf1 source-interface TenGigabitEthernet 0/36
tacacs-server host 1.1.1.1 key 7 9a2f3ec0c65c6f41
tacacs-server host 2.2.2.2 key 7 9a2f3ec0c65c6f41
Dell(conf-tacacs-group)#
```

Related Commands

aaa authentication login — specifies the login authentication method.

tacacs-server key — configures a TACACS+ key for the TACACS server.

tacacs-server host

Specify a TACACS+ host.

S6000

Syntax

`tacacs-server host {`*`hostname`*` | `*`ipv4-address`*` | `*`ipv6-address`*`} [port `*`number`*`] [timeout `*`seconds`*`] [key `*`key`*`]`

Parameters

hostname	Enter the name of the TACACS+ server host.
ipv4-address | *ipv6-address*	Enter the IPv4 address (A.B.C.D) or IPv6 address (X:X:X:X::X) of the TACACS+ server host.
port *number*	(OPTIONAL) Enter the keyword `port` then a number as the port to be used by the TACACS+ server. The range is from zero (0) to 65535. The default is **49**.
timeout *seconds*	(OPTIONAL) Enter the keyword `timeout` then the number of seconds the switch waits for a reply from the TACACS+ server. The range is from 0 to 1000. The default is **10 seconds**.
key *key*	(OPTIONAL) Enter the keyword `key` then a string up to 42 characters long as the authentication key. This authentication key must match the key specified in the `tacacs-server key` for the TACACS+ daemon.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.1.0	Added support for IPv6.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Authentication key length increased to 42 characters.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

To list multiple TACACS+ servers to be used by the `aaa authentication login` command, configure this command multiple times.

If you are not configuring the switch as a TACACS+ server, you do not need to configure the `port`, `timeout` and `key` optional parameters. If you do not configure a key, the key assigned in the `tacacs-server key` command is used.

You can use duplicate host names or IP addresses among TACACS groups. However, you cannot use duplicate host names or IP addresses within the same TACACS group.

If a VRF is not configured on the TACACS group, then servers configured in the group are considered to be on the default VRF. TACACS servers that are configured in the CONFIGURATION mode are also considered to be on the default VRF.

For AAA servers to use a group of TACACS servers, you must explicitly configure the group using the `aaa tacacs group` *`group-name`* command. The order in which the TACACS servers are tried depends on the order in which they are configured.

Example

```
Dell(conf)#tacacs-server group group1
Dell(conf-tacacs-group)#tacacs-server host 1.1.1.1 key secret
Dell(conf-tacacs-group)#no tacacs-server host 1.1.1.1
```

Related Commands

aaa authentication login — specifies the login authentication method.

tacacs-server key — configures a TACACS+ key for the TACACS server.

tacacs-server key

Configure a key for communication between a TACACS+ server and a client.

S6000

Syntax	`tacacs-server key [encryption-type] key` To delete a key, use the `no tacacs-server key key` command.
Parameters	*encryption-type*: (OPTIONAL) Enter either zero (`0`) or `7` as the encryption type for the key entered. The options are: • `0` is the default and means the key is not encrypted and stored as clear text. • `7` means that the key is encrypted and hidden. *key*: Enter a text string, up to 42 characters long, as the clear text password. Leading spaces are ignored.
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version	Description
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Authentication key length increased to 42 characters.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information: The key configured with this command must match the key configured on the TACACS+ daemon.

tacacs-server vrf

Create an association between a TACACS server group and a VRF and source interface..

Syntax

`tacacs-server vrf` *`vrf-name`* `[source-interface` *`interface]`*

To delete the association between a TACACS server group and a VRF and source interface, use the `no tacacs-server vrf vrf-name [source-interface` *`interface`*`]` command.

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF to associate a TACACS server group with that VRF.
interface	Enter the following keywords and slot/port or number information: • For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16838. • For the Null interface, enter the keywords `null 0`. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults

Not configured.

Command Modes

TACACS SERVER GROUP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

You can use this command to associate a group of TACACS servers with a VRF and source interface. You can configure the source interface only with the VRF attribute and source interface is optional with the VRF attributes.

If VRF is not configured on the TACACS group, then the group is considered to be on the default VRF.

RADIUS groups and VRFs have one-to-one mapping. If a VRF is configured with one RADIUS group, then you cannot use the same VRF with another RADIUS group. When the VRF is removed, then the corresponding RADIUS group is also removed automatically.

Example

```
Dell(conf)#tacacs-server group group1
Dell(conf-tacacs-group)#tacacs-server vrf vrf1 source-
interface tengigabitethernet 0/36

Dell(conf)#tacacs-server group group2
Dell(conf-tacacs-group)#tacacs-server vrf default
```

Port Authentication (802.1X) Commands

An authentication server must authenticate a client connected to an 802.1X switch port. Until the authentication, only Extensible Authentication Protocol over LAN (EAPOL) traffic is allowed through the port to which a client is connected. After authentication is successful, normal traffic passes through the port.

Dell Networking OS supports RADIUS and Active Directory environments using 802.1X Port Authentication.

Important Points to Remember

Dell Networking OS limits network access for certain users by using VLAN assignments. 802.1X with VLAN assignment has these characteristics when configured on the switch and the RADIUS server.

- 802.1X is supported on S6000.
- 802.1X is not supported on the LAG or the channel members of a LAG.
- If no VLAN is supplied by the RADIUS server or if 802.1X authorization is disabled, the port is configured in its access VLAN after successful authentication.
- If 802.1X authorization is enabled but the VLAN information from the RADIUS server is not valid, the port returns to the Unauthorized state and remains in the configured access VLAN. This prevents ports from appearing unexpectedly in an inappropriate VLAN due to a configuration error. Configuration errors create an entry in Syslog.
- If 802.1X authorization is enabled and all information from the RADIUS server is valid, the port is placed in the specified VLAN after authentication.
- If port security is enabled on an 802.1X port with VLAN assignment, the port is placed in the RADIUS server assigned VLAN.
- If 802.1X is disabled on the port, it is returned to the configured access VLAN.
- When the port is in the Force Authorized, Force Unauthorized, or Shutdown state, it is placed in the configured access VLAN.
- If an 802.1X port is authenticated and put in the RADIUS server assigned VLAN, any change to the port access VLAN configuration does not take effect.
- The 802.1X with VLAN assignment feature is not supported on trunk ports, dynamic ports, or with dynamic-access port assignment through a VLAN membership.

dot1x authentication (Configuration)

Enable dot1x globally; dot1x must be enabled both globally and at the interface level.

S6000

Syntax	`dot1x authentication` To disable dot1x on globally, use the `no dot1x authentication` command.
Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands	dot1x authentication (Interface) — enables dot1x on an interface.

dot1x authentication (Interface)

Enable dot1x on an interface; dot1x must be enabled both globally and at the interface level.

S6000

Syntax	`dot1x authentication` To disable dot1x on an interface, use the `no dot1x authentication` command.
Defaults	Disabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands

[dot1x authentication (Configuration)](#) — enables dot1x globally.

dot1x auth-fail-vlan

Configure an authentication failure VLAN for users and devices that fail 802.1X authentication.

S6000

Syntax

`dot1x auth-fail-vlan vlan-id [max-attempts number]`

To delete the authentication failure VLAN, use the `no dot1x auth-fail-vlan vlan-id [max-attempts number]` command.

Parameters

vlan-id	Enter the VLAN Identifier. The range is from 1 to 4094.
max-attempts *number*	(OPTIONAL) Enter the keywords `max-attempts` then number of attempts desired before authentication fails. The range is from 1 to 5. The default is **3**.

Defaults

3 attempts

Command Modes

CONFIGURATION (conf-if-interface-slot/port)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series, S-Series, and E-Series.

Usage Information

If the host responds to 802.1X with an incorrect login/password, the login fails. The switch attempts to authenticate again until the maximum attempts configured is reached. If the authentication fails after all allowed attempts, the interface is moved to the authentication failed VLAN.

After the authentication VLAN is assigned, the port-state must be toggled to restart authentication. Authentication occurs at the next re-authentication interval (`dot1x reauthentication`).

Related Commands	dot1x port-control — enables port-control on an interface. dot1x guest-vlan — configures a guest VLAN for non-dot1x devices. show dot1x interface — displays the 802.1X information on an interface.

dot1x auth-server

Configure the authentication server to RADIUS.

S6000

Syntax	`dot1x auth-server radius`
Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x guest-vlan

Configure a guest VLAN for limited access users or for devices that are not 802.1X capable.

S6000

Syntax	`dot1x guest-vlan` *`vlan-id`* To disable the guest VLAN, use the `no dot1x guest-vlan` *`vlan-id`* command.

Parameters

vlan-id	Enter the VLAN Identifier. The range is from 1 to 4094.

Defaults

Not configured.

Command Modes

CONFIGURATION (conf-if-interface-slot/port)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series, S-Series, and E-Series.

Usage Information

802.1X authentication is enabled when an interface is connected to the switch. If the host fails to respond within a designated amount of time, the authenticator places the port in the guest VLAN.

If a device does not respond within 30 seconds, it is assumed that the device is not 802.1X capable. Therefore, a guest VLAN is allocated to the interface and authentication for the device occurs at the next re-authentication interval (`dot1x reauthentication`).

If the host fails authentication for the designated number of times, the authenticator places the port in authentication failed VLAN (`dot1x auth-fail-vlan`).

NOTE: The layer 3 portion of guest VLAN and authentication fail VLANs can be created regardless if the VLAN is assigned to an interface or not. After an interface is assigned a guest VLAN (which has an IP address), routing through the guest VLAN is the same as any other traffic. However, the interface may join/leave a VLAN dynamically.

Related Commands

dot1x auth-fail-vlan — configures a VLAN for authentication failures.

dot1x reauthentication — enables periodic re-authentication.

show dot1x interface — displays the 802.1X information on an interface.

dot1x mac-auth-bypass

Enable MAC authentication bypass. If 802.1X times out because the host did not respond to the Identity Request frame, Dell Networking OS attempts to authenticate the host based on its MAC address.

S6000

Syntax	`[no] dot1x mac-auth-bypass`
Defaults	Disabled
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.4	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.1.0	Introduced on the C-Series and S-Series.

Usage Information	To disable MAC authentication bypass on a port, enter the `no dot1x mac-auth-bypass` command.

dot1x max-eap-req

Configure the maximum number of times an extensive authentication protocol (EAP) request is transmitted before the session times out.

S6000

Syntax	`dot1x max-eap-req` *`number`* To return to the default, use the `no dot1x max-eap-req` command.
Parameters	

number	Enter the number of times an EAP request is transmitted before a session time-out. The range is from 1 to 10. The default is **2**.

Defaults	**2**
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands

interface range — configures a range of interfaces.

dot1x port-control

Enable port control on an interface.

S6000

Syntax

```
dot1x port-control {force-authorized | auto | force-
unauthorized}
```

Parameters

force-authorized	Enter the keywords `force-authorized` to forcibly authorize a port.
auto	Enter the keyword `auto` to authorize a port based on the 802.1X operation result.
force-unauthorized	Enter the keywords `force-unauthorized` to forcibly de-authorize a port.

Defaults

none

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information: The authenticator performs authentication only when `port-control` is set to `auto`.

dot1x quiet-period

Set the number of seconds that the authenticator remains quiet after a failed authentication with a client.

S6000

Syntax

```
dot1x quiet-period seconds
```

To disable quiet time, use the `no dot1x quiet-time` command.

Parameters

seconds	Enter the number of seconds. The range is from 1 to 65535. The default is **30**.

Defaults: **30 seconds**

Command Modes: INTERFACE

Command History: This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x reauthentication

Enable periodic re-authentication of the client.

S6000

Syntax

```
dot1x reauthentication [interval seconds]
```

To disable periodic re-authentication, use `the no dot1x reauthentication` command.

Parameters		
	interval *seconds*	(Optional) Enter the keyword `interval` then the interval time, in seconds, after which re-authentication is initiated. The range is from 1 to 31536000 (1 year). The default is**3600 (1 hour)**.

Defaults **3600 seconds (1 hour)**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

Related Commands interface range — configures a range of interfaces.

dot1x reauth-max

Configure the maximum number of times a port can re-authenticate before the port becomes unauthorized.

S6000

Syntax `dot1x reauth-max number`

To return to the default, use the `no dot1x reauth-max` command.

Parameters		
	number	Enter the permitted number of re-authentications. The range is from 1 to 10. The default is **2**.

Defaults **2**

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x server-timeout

Configure the amount of time after which exchanges with the server time-out.

S6000

Syntax

```
dot1x server-timeout seconds
```

To return to the default, use the `no dot1x server-timeout` command.

Parameters

seconds	Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.

Defaults **30 seconds**

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x supplicant-timeout

Configure the amount of time after which exchanges with the supplicant time-out.

S6000

Syntax	`dot1x supplicant-timeout seconds` To return to the default, use the`no dot1x supplicant-timeout` command.
Parameters	*seconds*: Enter a time-out value in seconds. The range is from 1 to 300, where 300 is implementation dependant. The default is **30**.
Defaults	**30 seconds**
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

dot1x tx-period

Configure the intervals at which EAPOL PDUs are transmitted by the Authenticator PAE.

S6000

Syntax	`dot1x tx-period seconds` To return to the default, use the `no dot1x tx-period` command.
Parameters	*seconds*: Enter the interval time, in seconds, that EAPOL PDUs are transmitted. The range is from 1 to 65535 (1 year). The default is **30**.
Defaults	**30 seconds**

Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
Version 7.4.1.0	Introduced on the E-Series.

show dot1x interface

Display the 802.1X information on an interface.

S6000

Syntax

```
show dot1x interface interface
```

Parameters

interface — Enter one of the following keywords and slot/port or number information:

- For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.
- For a Fast Ethernet interface, enter the keyword `FastEthernet` then the slot/ port information.
- For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

Defaults none

Command Modes

- EXEC
- EXEC privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series, S-Series, and E-Series.

Example

```
Dell#show dot1x interface fortyGigE 0/48

802.1x information on Fo 0/48:
-----------------------------
Dot1x Status:             Enable
Port Control:             AUTO
Port Auth Status:         UNAUTHORIZED
Re-Authentication:        Disable
Untagged VLAN id:         None
Guest VLAN:               Disable
Guest VLAN id:            NONE
Auth-Fail VLAN:           Disable
Auth-Fail VLAN id:        NONE
Auth-Fail Max-Attempts:   NONE
Mac-Auth-Bypass:          Disable
Mac-Auth-Bypass Only:     Disable
Tx Period:                30 seconds
Quiet Period:             60 seconds
ReAuth Max:               2
Supplicant Timeout:       30 seconds
Server Timeout:           30 seconds
Re-Auth Interval:         3600 seconds
Max-EAP-Req:              2
Host Mode:                SINGLE_HOST
Auth PAE State:           Initialize
Backend State:            Initialize
Dell#

Dell# show dot1x interface fortyGigE 0/48

802.1x information on Fo 0/48:
-----------------------------
Dot1x Status:             Enable
Port Control:             FORCE_AUTHORIZED
Port Auth Status:         UNAUTHORIZED
Re-Authentication:        Disable
Untagged VLAN id:         None
Guest VLAN:               Disable
Guest VLAN id:            NONE
Auth-Fail VLAN:           Disable
Auth-Fail VLAN id:        NONE
Auth-Fail Max-Attempts:   NONE
Mac-Auth-Bypass:          Disable
Mac-Auth-Bypass Only:     Disable
Tx Period:                30 seconds
Quiet Period:             60 seconds
ReAuth Max:               2
Supplicant Timeout:       30 seconds
Server Timeout:           30 seconds
Re-Auth Interval:         3600 seconds
```

```
Max-EAP-Req:              2
Host Mode:                SINGLE_HOST
Auth PAE State:           Initialize
Backend State:            Initialize
Dell#
```

SSH Server and SCP Commands

Dell Networking OS supports secure shell (SSH) protocol versions 1.5 and 2.0. SSH is a protocol for secure remote login over an insecure network. SSH sessions are encrypted and use authentication.

The SSH server and client are enhanced to support the VRF awareness functionality. Using this capability, an SSH client or server can use a VRF instance name to look up the correct routing table and establish a connection.

crypto key generate

Generate keys for the SSH server.

S6000

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell Networking representative.

```
crypto key generate {rsa | rsa1}
```

Parameters

rsa	Enter the keyword `rsa` then the key size to generate a SSHv2 RSA host keys. The range is from 1024 to 2048 if you did not enable FIPS mode; if you enabled FIPS mode, you can only generate a 2048-bit key. The default is **1024**. NOTE: You must have a license to access the FIPS mode. For more information, contact your Dell Networking representative.
rsa1	Enter the keyword `rsa1` then the key size to generate a SSHv1 RSA host keys. The range is from 1024 to 2048. The default is **1024**. NOTE: This option is not available in FIPS mode.

Defaults — Key size **1024**; if you enable FIPS mode, the key size is **2048**.

Command Modes — CONFIGURATION

Command History — This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Added support for FIPS mode on the S4810.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The host keys are required for key-exchange by the SSH server. If the keys are not found when you enable the server (`ip ssh server enable`), the keys are automatically generated.

This command requires user interaction and generates a prompt prior to overwriting any existing host keys.

NOTE: Only a user with superuser permissions should generate host-keys.

Example

```
Dell(conf)#crypto key generate rsa
Enter key size <1024-2048>. Default<1024>  :
Host key already exists. Overwrite (y/n)?y
Generating 1024-bit SSHv2 RSA key.
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
 ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
Dell(conf)#
Dell(conf)#crypto key generate rsa1
Enter key size <1024-2048>. Default<1024>  :
Host key already exists. Overwrite (y/n)?y
Generating 1024-bit SSHv1 RSA key.
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
 ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! !
! ! ! ! ! ! ! ! !
Dell(conf)#
```

Related Commands

ip ssh server — enables the SSH server.

show crypto — displays the SSH host public keys.

crypto key zeroize rsa

Removes the generated RSA host keys and zeroize the key storage location.

Syntax `crypto key zeroize rsa`

Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide.* The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL

Related Commands	crypto key generate — Generate keys for SSH server

debug ip ssh

Enables collecting SSH debug information.

S6000

Syntax

```
debug ip ssh {client | server}
```

To disable debugging, use the `no debug ip ssh {client | server}` command.

Parameters

client	Enter the keyword `client` to enable collecting debug information on the client.
server	Enter the keyword `server` to enable collecting debug information on the server.

Defaults	Disabled on both client and server.
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information Debug information includes details for key-exchange, authentication, and established session for each connection.

ip scp topdir

Identify a location for files used in secure copy transfer.

S6000

Syntax `ip scp topdir directory`

To return to the default setting, use the `no ip scp topdir` command.

Parameters

directory	Enter a directory name.

Defaults The internal flash (`flash:`) is the default directory.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information To configure the switch as an SCP server, use the `ip ssh server` command.

Related Commands ip ssh server — enables the SSH and SCP server on the switch.

ip ssh authentication-retries

Configure the maximum number of attempts that should be used to authenticate a user.

S6000

Syntax	`ip ssh authentication-retries 1-10`
Parameters	*1-10* — Enter the number of maximum retries to authenticate a user. The range is from 1 to 10. The default is **3**.
Defaults	**3**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information	This command specifies the maximum number of attempts to authenticate a user on an SSH connection with the remote host for password authentication. SSH disconnects when the number of password failures exceeds authentication-retries.

ip ssh connection-rate-limit

Configure the maximum number of incoming SSH connections per minute.

S6000

Syntax	`ip ssh connection-rate-limit 1-10`
Parameters	*1-10* — Enter the number of maximum numbers of incoming SSH connections allowed per minute. The range is from 1 to 10 per minute. The default is **10 per minute**.

Defaults	**10 per minute**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

ip ssh hostbased-authentication

Enable hostbased-authentication for the SSHv2 server.

S6000

Syntax

```
ip ssh hostbased-authentication enable
```

To disable hostbased-authentication for SSHv2 server, use the `no ip ssh hostbased-authentication enable` command.

Parameters

enable	Enter the keyword `enable` to enable hostbased-authentication for SSHv2 server.

Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

If you enable this command, clients can log in without a password prompt. This command provides two levels of authentication:

- rhost-authentication is done with the file specified in the `ip ssh rhostfile` command.
- checking client host-keys is done with the file specified in the `ip ssh pub-key-file` command.

NOTE: Administrators must specify the two files (`rhosts` and `pub-key-file`) to configure host-based authentication.

Related Commands

ip ssh pub-key-file — public keys of trusted hosts from a file.

ip ssh rhostsfile — trusted hosts and users for rhost authentication.

ip ssh key-size

Configure the size of the server-generated RSA SSHv1 key.

S6000

Syntax `ip ssh key-size` *`512-869`*

Parameters

512-869	Enter the key-size number for the server-generated RSA SSHv1 key. The range is from 512 to 869. The default is **768**.

Defaults Key size **768**

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The server-generated key is used for SSHv1 key-exchange.

ip ssh password-authentication

Enable password authentication for the SSH server.

S6000

Syntax

`ip ssh password-authentication enable`

To disable password-authentication, use the `no ip ssh password-authentication enable` command.

Parameters

enable	Enter the keyword `enable` to enable password-authentication for the SSH server.

Defaults

Enabled

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

With password authentication enabled, you can authenticate using the local, RADIUS, or TACACS+ password fallback order as configured.

ip ssh rekey

Configures the time rekey-interval or volume rekey-limit threshold at which to re-generate the SSH key during an SSH session.

Syntax	`ip ssh rekey [time rekey-interval] [volume rekey-limit]` To reset to the default, use `no ip ssh rekey [time rekey-interval] [volume rekey-limit]` command.

Parameters

time *minutes*	Enter the keywords `time` then the amount of time in minutes. The range is from 10 to 1440 minutes. The default is **60** minutes
volume *rekey-limit*	Enter the keywords **volume** then the amount of volume in megabytes. The range is from 1 to 4096 to megabytes. The default is **1024 megabytes**

Defaults	The default time is **60** minutes. The default volume is **1024** megabytes.
Command Modes	CONFIGURATION mode
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL

ip ssh pub-key-file

Specify the file used for host-based authentication.

S6000

Syntax	`ip ssh pub-key-file {WORD}`

Parameters

WORD	Enter the file name for the host-based authentication.

Defaults	none
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

This command specifies the file used for the host-based authentication. The `creates/` file overwrites the `flash://ADMIN_DIR/ssh/knownhosts` file and deletes the user-specified file. Even though this command is a global configuration command, it does not appear in the running configuration because you only need to run this command once.

The file contains the OpenSSH-compatible public keys of the host for which host-based authentication is allowed. An example known host file format:

```
poclab4,123.12.1.123 ssh-rsa AAAAB3NzaC1yc2EAAAABIwAAAIEAox/
QQp8xYhzOxn07yh4VGPAoUfgKoieTHO9G4sNV+ui
+DWEc3cgYAcU5Lai1MU2ODrzhCwyDNp05tKBU3t
ReG1o8AxLi6+S4hyEMqHzkzBFNVqHzpQc
+Rs4p2urzV0F4pRKnaXdHf3Lk4D460HZRhhVrxqeNxPDpEn WIMPJi0ds=
ashwani@poclab4
```

NOTE: For `rhostfile` and `pub-key-file`, the administrator must FTP the file to the chassis.

Example

```
Dell#conf
Dell(conf)# ip ssh pub-key-file flash://knownhosts
Dell(conf)#
```

Related Commands

show ip ssh client-pub-keys — displays the client-public keys used for the host-based authentication.

ip ssh rhostsfile

Specify the rhost file used for host-based authorization.

S6000

Syntax `ip ssh rhostsfile {WORD}`

Parameters

WORD	Enter the rhost file name for the host-based authentication.

Defaults none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#conf
Dell(conf)# ip ssh rhostsfile flash://shosts
Dell(conf)#
```

Usage Information

This command specifies the rhost file used for host-based authentication. This `creates/` file overwrites the `flash:/ADMIN_DIR/ssh/shosts` file and deletes the user-specified file. Even though this command is a global configuration command, it does not appear in the running configuration because you only need to run this command once.

This file contains hostnames and usernames, for which hosts and users, rhost-authentication can be allowed.

NOTE: For `rhostfile` and `pub-key-file`, the administrator must FTP the file to the switch.

ip ssh rsa-authentication (Config)

Enable RSA authentication for the SSHv2 server.

S6000

Syntax

`ip ssh rsa-authentication enable`

To disable RSA authentication, use the `no ip ssh rsa-authentication enable` command.

Parameters

enable	Enter the keyword `enable` to enable RSA authentication for the SSHv2 server.

Defaults	Disabled.
Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Enabling RSA authentication allows the user to log in without being prompted for a password. In addition, the OpenSSH compatible SSHv2 RSA public key must be added to the list of authorized keys (`ip ssh rsa-authentication my-authorized-keys device://filename` command).

ip ssh server

Configure an SSH server. SSH server is enabled by default.

S6000

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell Networking representative.

```
ip ssh server {enable | port port-number} [version {1 | 2}]
```

To disable SSH server functions, use the `no ip ssh server enable` command.

Parameters

enable	Enter the key word `enable` to start the SSH server.
port *port-number*	(OPTIONAL) Enter the keyword `port` then the port number of the listening port of the SSH server. The range is from 1 to 65535. The default is **22**.
[version {1 | 2}]	(OPTIONAL) Enter the keyword `version` then the SSH version 1 or 2 to specify only SSHv1 or SSHv2.

NOTE: If you enable FIPS mode, you can only select version 2.

Defaults	Default listening port is **22**.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

This command enables the SSH server and begins listening on a port. If a port is not specified, listening is on SSH default port 22.

NOTE: Starting with Dell Networking OS Release 9.2(0.0), SSH server is enabled by default.

Example

```
Dell# conf
Dell(conf)# ip ssh server port 45
Dell(conf)# ip ssh server enable
Dell#
```

Related Commands

show ip ssh — displays the ssh information.

ip ssh server vrf

Configure an SSH server on either a specific VRF or a management VRF.

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell Networking representative.

`ip ssh server vrf {management | vrf-name}`

To disable the SSH server configuration, use the `no ip ssh server vrf {management | vrf-name}` command.

Parameters

vrf management	Enter the key word `vrf` followed by the keyword `management` to configure an SSH server on a management VRF.
vrf *vrf-name*	Enter the key word `vrf` followed by the VRF name to configure an SSH server on that VRF.

Defaults None

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

You can enable the SSH server on either a management VRF or a user defined VRF but not both. If no VRF is specified, then the SSH server is enabled on the default VRF.

If the SSH server is enabled on a VRF with name vrf1, then use the following command to restart the SSH server on a VRF with name vrf2: `ip ssh server vrf vrf2`. If the SSH server is enabled on a VRF with name vrf1, then use the following command to restart the SSH server on the default VRF: `ip ssh server vrf`.

Example

```
•    Dell(conf)#ip ssh server vrf vrf1
•    Dell(conf)#no ip ssh server vrf
•    Dell(conf)#ip ssh server vrf management
•    Dell(conf)#no ip ssh server vrf
```

Related Commands

show ip ssh — displays the ssh information.

ip ssh source-interface

Specifies an interface's IP address as the source IP address for an outgoing SSH connections.

Syntax `ip ssh source-interface` *`interface`*

To delete a source interface, use the `no ip ssh source-interface` command.

Parameters	*interface*	Enter the following keywords and slot/port or number information: • For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16838. • For the Null interface, enter the keywords `null 0`. • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults Not configured.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information The `source-interface` *`interface`* attribute is applicable for both the `SSH client` as well as the `COPY` (SCP) commands. Using these attributes the client session tags an error to the user during run time, in case there is a mismatch between this command and the `ip ssh vrf` command.

Example

```
Dell(conf)#ip ssh source-interface tengigabitethernet 0/36
Dell(conf)#do ssh 10.10.10.2 -l admin
Dell(conf)#no ip ssh source-interface
```

ip ssh vrf

Specify a VRF for an outgoing SSH connections.

Syntax `ip ssh vrf` *`vrf-name`*

To delete a VRF for an outgoing SSH connection, use the `no ip ssh vrf` *`vrf-name`* command.

Parameters		
	vrf ***vrf-name***	Enter the keyword `vrf` and then the name of the VRF to configure that VRF for an outgoing SSH session.

Defaults Not configured.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

If you configure a VRF for an SSH session, then you need not explicitly mention the same VRF for the SSH client sessions intended for that VRF. The `vrf` attribute in the `ip ssh vrf` command is applicable for both the SSH client as well as the COPY (SCP) commands.

Example

```
Dell(conf)#ip ssh vrf vrf1
Dell(conf)#do ssh 10.10.10.2 -l admin
Dell(conf)#no ip ssh vrf vrf1
```

show crypto

Display the public part of the SSH host-keys.

S6000

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell Networking representative.

```
show crypto key mypubkey {rsa | rsa1}
```

Parameters

Key	Enter the keyword `key` to display the host public key.
mypubkey	Enter the keyword `mypubkey` to display the host public key.
rsa	Enter the keyword `rsa` to display the host SSHv2 RSA public key.
rsa1	Enter the keyword `rsa1` to display the host SSHv1 RSA public key. **NOTE:** If you enable FIPS mode, this parameter is not available.

Defaults

none

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

This command is useful if the remote SSH client implements Strict Host Key Checking. You can copy the host key to your list of known hosts.

Example

```
Dell#show crypto key mypubkey rsa1
1024 65537
150477578329696762034442036788963493870885070479991994815292070
626705966514872389873388513888726045587485998010070732182414929
030692027544033783833684808165051718757388498171624789464677065
606836272077109398066281380715348265219018664838324451688712041
531630245739774449604335364302251481307373438756957374121

Dell#show crypto key mypubkey rsa
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAAAgQC9IYgcUcc8wQm+5KUQgW/
zAs8V5STalGq4/+S+6H9axpQnA+A0xweeo5iR5hvPP6Vc+HS+uWoQH
+VOJ8H5Jxsm347XnYv/gpSqhgjZ/C5UwFiucVkVfYu8RDcJVIuQhLvPEebIF5Q
+sD8K89MXU90MAS/UdoiJZSOIlbaCuSTW1Q==

Dell#
```

Related Commands

crypto key generate — generates the SSH keys.

show ip ssh

Display information about established SSH sessions.

S6000

Syntax

NOTE: Some of the parameters in this command require licensing to access. For more information, contact your Dell Networking representative.

```
show ip ssh
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show ip ssh
SSH server                : enabled.
SSH server version        : v1 and v2.
SSH server vrf            : default.
SSH server ciphers        : 3des-cbc,aes128-cbc,aes192-
cbc,aes256-cbc,aes128-ctr,aes192-ctr,aes256-ctr.
SSH server macs           : hmac-md5,hmac-md5-96,hmac-
sha1,hmac-sha1-96,hmac-sha2-256,hmac-sha2-256-96.
SSH server kex algorithms : diffie-hellman-group-exchange-
sha1,diffie-hellman-group1-sha1,diffie-hellman-group14-sha1.
Password Authentication   : enabled.
Hostbased Authentication  : disabled.
RSA       Authentication  : disabled.
   Vty          Encryption      HMAC            Remote IP
   2            aes128-cbc      hmac-md5        10.16.127.141
   4            aes128-cbc      hmac-md5        10.16.127.141
*  5            aes128-cbc      hmac-md5        10.16.127.141
Dell#
```

Related Commands

ip ssh server — configures an SSH server.

show ip ssh client-pub-keys — displays the client-public keys.

show ip ssh client-pub-keys

Display the client public keys used in host-based authentication.

S6000

Syntax `show ip ssh client-pub-keys`

Defaults

none

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

This command displays the contents of the `flash://ADMIN_DIRssh/knownhosts` file.

Example

```
Dell# show ip ssh client-pub-keys
4.8.1.2 ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAIEAu5NoTbmnLxBknaeXZmUJMupNwNUoGlo1/
yLPI5eehQTyaldRPHtGyPlcmMbCH
+QJkqtyiwDPmH4njyDMYDCXY85vc55ibWsN9qalagklnh2cj2q4nYj5x8+8OOhY
eFPaHiygd8U/FXict61jWs84Co1UTsAgRzDJ9aUSS75TVac= root@dt-maa-
linux-1.force10networks.c
om
2200:2200:2200:2200:2200::2202 ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAIEAu5NoTbmnLxBknaeXZmUJMupNwNUoGlo1/
yLPI5eehQTyaldRPHtGyPlcmMbCH
+QJkqtyiwDPmH4njyDMYDCXY85vc55ibWsN9qalagklnh2cj2q4nYj5x8+8OOhY
eFPaHiygd8U/FXict61jWs84Co1UTsAgRzDJ9aUSS75TVac= root@dt-maa-li
nux-1.force10networks.com
10.16.151.48 ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAIEAu5NoTbmnLxBknaeXZmUJMupNwNUoGlo1/
yLPI5eehQTyaldRPHtGyPlcmMbCH
+QJkqtyiwDPmH4njyDMYDCXY85vc55ibWsN9qalagklnh2cj2q4nYj5x8+8OOhY
eFPaHiygd8U/FXict61jWs84Co1UTsAgRzDJ9aUSS75TVac=
Dell#
```

Related Commands

ip ssh pub-key-file — configures the filename for the host-based authentication.

ssh

Open an SSH connection specifying the hostname, username, encryption cipher, HMAC algorithm, port number, and version of the SSH client.

S6000

Syntax	**NOTE:** Some of the parameters in this command require licensing to access. For more information, contact your Dell Networking representative. `ssh [vrf vrf-name] {hostname | ipv4 address | ipv6 address} [-c encryption cipher | -l username | -m HMAC algorithm | -p port-number | -v {1 | 2}]`
Parameters	

vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` aand then the name of the VRF to specify the VRF used with the SSH session. **NOTE:** The VRF configured using this command has a higher precedence than the VRF configured using the `ip ssh vrf vrf-name` command. If you do not configure a VRF using this command, then the SSH client uses the configured VRF (if any). If there is a mismatch between VRFs that are configured using the `ip ssh source-interface` command and the `ssh vrf vrf-name` command, then an error is reported.
hostname	(OPTIONAL) Enter the IP address or the host name of the remote device.
vrf instance	(OPTIONAL) E-Series Only: Enter the keyword `vrf` then the VRF Instance name to open an SSH connection to that instance.
ipv4 address	(OPTIONAL) Enter the IP address in dotted decimal format A.B.C.D.
ipv6-address prefix-length	(OPTIONAL) Enter the IPv6 address in the x:x:x:x::x format then the prefix length in the /x format. The range is from /0 to /128. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
-c *encryption cipher*	Enable the “FIPS mode enable", this mode will support only v2 client. "no fips mode enable"(disable) will support v1 & v2 client. This comment is applicable for both ciphers & HMAC algorithms: • `3des-cbc`: Force ssh to use 3des-cbc encryption cipher. • `aes128-cbc` : Force ssh to use aes128-cbc encryption cipher

	• `aes192-cbc` : Force ssh to use aes192-cbc encryption cipher • `aes256-cbc` : Force ssh to use aes256-cbc encryption cipher • `aes128-ctr` : Force ssh to use aes128-ctr encryption cipher • `aes192-ctr` : Force ssh to use aes192-ctr encryption cipher • `aes256-ctr` : Force ssh to use aes256-ctr encryption cipher
-l *username*	(OPTIONAL) Enter the keyword `-l` then the user name used in this SSH session. The default is the user name of the user associated with the terminal.
-m *HMAC algorithm*	Enter one of the following HMAC algorithms to use. (For v2 clients only): "no fips mode enable"(disable) will support v1 & v2 client. • `hmac-md5`: Force ssh to use hmac-md5 HMAC algorithm. • `hmac-md5-96`: Force ssh to use hmac-md5-96 HMAC algorithm. • `hmac-sha1`: Force ssh to use hmac-sha1 HMAC algorithm. • `hmac-sha1-96` : Force ssh to use hmac-sha1-96 HMAC algorithm. • `hmac-sha2-256` : Force ssh to use hmac-sha2-256 HMAC algorithm. • `hmac-sha2-256-96`: Force ssh to use hmac-sha2-256-96 HMAC algorithm.
-p *port-number*	(OPTIONAL) Enter the keyword `-p` then the port number. The range is from 1 to 65535. The default is **22**.
-v {1 | 2}	(OPTIONAL) Enter the keyword `-v` then the SSH version 1 or 2. The default is the version from the protocol negotiation.

Defaults	As shown in the *Parameters* section.
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.12.0	Added support for the `-c` and `-m` parameters on the S4810.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Added IPv6 support. Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Dell Networking OS supports both inbound and outbound SSH sessions using IPv4 or IPv6 addressing. Inbound SSH supports accessing the system through the management interface as well as through a physical Layer 3 interface.

Example

```
Dell#ssh 10.16.151.48 -l anvltest

Trying 10.16.151.48...
01:18:16: %STKUNIT0-M:CP %SEC-5-SSH_USAGE: Initiated SSH
Client v2 (FIPS Disabled) to anvltest@10.16.151.48 by default
from console
anvltest@10.16.151.48's password:
Last login: Thu Jan  5 00:17:47 2012 from login-maa-101
[anvltest@dt-maa-linux-1 ~]# exit
logout
Dell#
```

```
Dell#ssh vrf vrf1 10.10.10.2 -l admin
```

Secure DHCP Commands

DHCP as defined by RFC 2131 provides no authentication or security mechanisms. Secure DHCP is a suite of features that protects networks that use dynamic address allocation from spoofing and attacks.

clear ip dhcp snooping

Clear the DHCP binding table.

S6000

Syntax	`clear ip dhcp snooping binding`
Defaults	none
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

show ip dhcp snooping — displays the contents of the DHCP binding table.

ip dhcp relay

Enable Option 82.

S6000

Syntax

```
ip dhcp relay information-option [trust-downstream | vrf]
```

Parameters

trust-downstream	Configure the system to trust Option 82 when it is received from the previous-hop router.
vrf	Enter the keyword `vrf` to include VRF related information in the Option 82. This configuration enables the relay agent to include VRF related information when it forwards the broadcasts from client to DHCP server.

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping

Enable DHCP Snooping globally.

S6000

Syntax

```
[no] ip dhcp snooping
```

Defaults

Disabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

When enabled, no learning takes place until you enable snooping on a VLAN. After disabling DHCP Snooping, the binding table is deleted and Option 82, IP Source Guard, and Dynamic ARP Inspection are disabled.

Related Commands

ip dhcp snooping vlan — enables DHCP Snooping on one or more VLANs.

ip dhcp snooping binding

Create a static entry in the DHCP binding table.

S6000

Syntax

```
[no] ip dhcp snooping binding mac address vlan-id vlan-id ip
ip-address interface type slot/port lease number
```

Parameters

mac *address*	Enter the keyword `mac` then the MAC address of the host to which the server is leasing the IP address.
vlan-id *vlan-id*	Enter the keywords `vlan-id` then the VLAN to which the host belongs. The range is from 2 to 4094.

ip *ip-address*	Enter the keyword `ip` then the IP address that the server is leasing.
interface *type*	Enter the keyword `interface` then the type of interface to which the host is connected. • For an 10/100 Ethernet interface, enter the keyword `fastethernet`. • For a ten-Gigabit Ethernet interface, enter the keyword `tengigabitethernet`. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE`.
slot/port	Enter the slot and port number of the interface.
lease *time*	Enter the keyword `lease` then the amount of time the IP address is leased. The range is from 1 to 4294967295.

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

show ip dhcp snooping — displays the contents of the DHCP binding table.

ip dhcp snooping database renew

Renew the binding table.

S6000

Syntax

```
ip dhcp snooping database renew
```

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping trust

Configure an interface as trusted.

S6000

Syntax `[no] ip dhcp snooping trust`

Defaults Untrusted

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp source-address-validation

Enable IP source guard.

S6000

Syntax	`[no] ip dhcp source-address-validation`
Defaults	Disabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

ip dhcp snooping vlan

Enable DHCP Snooping on one or more VLANs.

S6000

Syntax	`[no] ip dhcp snooping vlan name`
Parameters	

name	Enter the name of a VLAN on which to enable DHCP Snooping.

Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Usage Information

When enabled, the system begins creating entries in the binding table for the specified VLANs.

NOTE: Learning only happens if there is a trusted port in the VLAN.

Related Commands

ip dhcp snooping trust — configures an interface as trusted.

show ip dhcp snooping

Display the contents of the DHCP binding table.

S6000

Syntax

```
show ip dhcp snooping binding
```

Defaults

none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.8.1.0	Introduced on the C-Series and S-Series.

Related Commands

clear ip dhcp snooping — clears the contents of the DHCP binding table.

Role-Based Access Control Commands

With Role-Based Access Control (RBAC), access and authorization is controlled based on a user’s role. Users are granted permissions based on their user roles, not on their individual user ID. User roles are created for job functions and through those roles they acquire the permissions to perform their associated job function.

This section describes the syntax and usage of RBAC-specific commands. You can find information on other related security commands in this chapter:

- aaa accounting
- aaa authentication login
- aaa authorization commands
- authorization
- show accounting
- show users
- username

aaa authorization role-only

Configure authentication to use the user’s role only when determining if access to commands is permitted.

Syntax

```
aaa authorization role-only
```

To return to the default setting, use the `no aaa authentication role-only` command.

Parameters

name	Enter a text string for the name of the user up to 63 characters. It cannot be one of the system defined roles (sysadmin, secadmin, netadmin, netoperator).
inherit *existing-role-name*	Enter the `inherit` keyword then specify the system defined role to inherit permissions from (sysadmin, secadmin, netadmin, netoperator).

Defaults

none

Command Modes

CONFIGURATION

Command History

Version 9.5.(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL

Usage Information

By default, access to commands are determined by the user’s role (if defined) or by the user’s privilege level. If the `aaa authorization role-only` command is enabled, then only the user’s role is used.

Before you enable role-based only AAA authorization:

1. Locally define a system administrator user role.This will give you access to login with full permissions even if network connectivity to remote authentication servers is not available.

2. Configure login authentication on the console. This ensures that all users are properly identified through authentication no matter the access point
3. Specify an authentication method (RADIUS, TACACS+, or Local).
4. Specify authorization method (RADIUS, TACACS+ or Local).
5. Verify the configuration has been applied to the console or VTY line.

Related Commands

login authentication, password, radius-server host, tacacs-server host

role

Changes command permissions for roles.

Syntax

`role mode` { { `addrole` | `deleterole` } *role-name* } | `reset` } *command*

To delete access to a command, use the `no role` *mode* *`role-name`*

Parameters

mode	Enter one of the following keywords as the mode for which you are controlling access: configure for CONFIGURATION mode exec for EXEC mode interface for INTERFACE modes line for LINE mode route-map for Route-map mode router for Router mode
addrole	Enter the keyword `addrole` to add permission to the command. You cannot add or delete rights for the sysadmin role.
deleterole	Enter the keyword deleterole to remove access to the command. You cannot add or delete rights for the sysadmin role.
role-name	Enter a text string for the name of the user role up to 63 characters. These are 3 system defined roles you can modify: secadmin, netadmin, and netoperator.
reset	Enter the keyword `reset` to reset all roles back to default for that command.
command	Enter the command's keywords to assign the command to a certain access level. You can enter one or more keywords.

Defaults	none
Command Modes	CONFIGURATION
Command History	**Version 9.5.(0.0)** Introduced on the Z9000, S6000, S4820T, S4810, MXL
Related Commands	**userrole**

show role

Display information on permissions assigned to a command, including user role and/or permission level.

Syntax

```
show role mode {mode} {command}
```

Parameters

command	Enter the command's keywords to assign the command to a certain access level. You can enter one or all of the keywords.
mode *mode*	Enter keyword then one of the following modes. • configure • exec • interface • line • route-map • router

Defaults	none
Command Modes	EXEC Privilege
Command History	**Version 9.5(0.0)** Introduced on the Z9000, S6000, S4820T, S4810, MXL

Examples

```
Dell#show role mode configure username
Role access: sysadmin

Dell#show role mode configure management route
Role access: netadmin, sysadmin

Dell#show role mode configure management crypto-policy
Role access: secadmin, sysadmin
```

Related Commands: userrole, username, privilege

show userroles

Display information on all defined user roles.

Syntax	`show userroles`

Example

```
Dell#show userroles
Role            Inheritance  Modes
netoperator                  Exec
netadmin                     Exec Config Interface Line Router IP
                             Route-map Protocol MAC
secadmin                     Exec Config
sysadmin                     Exec Config Interface Line Router IP
                             Route-map Protocol MAC
netoperator
testadmin       netadmin     Exec Config Interface Line Router IP
                             Route-map Protocol MAC
```

Command Modes	EXEC Privilege
Command History	Version 9.5(0.0) — Introduced on the Z9000, S6000, S4820T, S4810, MXL.
Related Commands	userrole, username

userrole

Create user roles for the role-based security model.

Syntax

`userrole` *`name`* `inherit` *`existing-role-name`*

To delete a role name, use the no userrole *name* command. Note that the reserved role names may not be deleted.

Parameters

name	Enter a text string for the name of the user up to 63 characters. It cannot be one of the system defined roles (sysadmin, secadmin, netadmin, netoperator).
inherit *existing-role-name*	Enter the `inherit` keyword then specify the system defined role to inherit permissions from (sysadmin, secadmin, netadmin, netoperator).

Defaults	none
Command Modes	CONFIGURATION

Command History

Version 9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, MXL.

Usage Information

Instead of using the system defined user roles, you can create a new user role that best matches your organization. When you create a new user role, you first inherit permissions from one of the system defined roles. Otherwise you would have to create a user role from scratch. You then restrict commands or add commands to that role. For information about this topic, See *Modifying Command Permissions for Roles*.

NOTE: You can change user role permissions on system pre-defined user roles or user-defined user roles.

Important Points to Remember

Consider the following when creating a user role:

- Only the system administrator and user-defined roles inherited from the system administrator can create roles and usernames. Only the system administrator, security administrator, and roles inherited from these can use the `role` command to modify command permissions. The security administrator and roles inherited by security administrator can only modify permissions for commands they already have access to.
- Make sure you select the correct role you want to inherit.

NOTE: If you inherit a user role, you cannot modify or delete the inheritance. If you want to change or remove the inheritance, delete the user role and create it again. If the user role is in use, you cannot delete the user role.

Related Commands

role mode { { { **addrole | deleterole** } *role-name* } | **reset** } *command* – Modifies (adds or deletes) command permissions for newly created user roles and system defined roles.

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Service Provider Bridging

Service provider bridging is composed of virtual local area network (VLAN) Stacking, Layer 2 Protocol Tunneling, and Provider Backbone Bridging as described in the *Dell Networking OS Configuration Guide Service Provider Bridging* chapter.

This chapter includes command line information (CLI) for the Dell Networking operating software Layer 2 Protocol Tunneling (L2PT). L2PT enables protocols to tunnel through an 802.1q tunnel.

Dell Networking OS supports L2PT on the S6000 platform.

For more information, refer to VLAN Stacking, Spanning Tree Protocol (STP), and GARP VLAN Registration (GVRP).

Important Points to Remember

- L2PT is enabled at the interface VLAN-Stack VLAN level. For more information about Stackable VLAN (VLAN-Stacking) commands, refer to VLAN Stacking.
- The default behavior is to disable protocol packet tunneling through the 802.1q tunnel.
- Rate-limiting is required to protect against bridge protocol data units (BPDU) attacks.
- A port channel (including through link aggregation control protocol [LACP]) can be configured as a VLAN-Stack access or trunk port.
- Address resolution protocol (ARP) packets work as expected across the tunnel.
- Far-end failure detection (FEFD) works the same as with Layer 2 links.
- Protocols that use Multicast MAC addresses (for example, open shortest path first [OSPF]) work as expected and carry over to the other end of the VLAN-Stack VLAN.

debug protocol-tunnel

Enable debugging to ensure incoming packets are received and rewritten to a new MAC address.

S6000

Syntax

`debug protocol-tunnel interface {in | out | both} [vlan vlan-id] [count value]`

To disable debugging, use the `no debug protocol-tunnel interface {in | out | both} [vlan vlan-id] [count value]` command.

Parameters

interface	Enter one of the following interfaces and slot/port information:

- For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.
- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.

in | out | both	Enter the keyword `in`, `out`, or `both` to debug incoming interfaces, outgoing interfaces, or both incoming and outgoing interfaces.
vlan *vlan-id*	Enter the keyword `vlan` then the VLAN ID. The range is from 1 to 4094.
count *value*	Enter the keyword `count` then the number of debug outputs. The range is from 1 to 100.

Defaults	Debug disabled.
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series, E-Series, and E-Series ExaScale.
Version 7.4.1.0	Introduced

protocol-tunnel

Enable protocol tunneling on a stacked (Q-in-Q) VLAN for specified protocol packets.

S6000

Syntax `protocol-tunnel {rate-limit rate| stp}`

To disable protocol tunneling for a Layer 2 protocol, use the `no protocol-tunnel` command.

Parameters

rate-limit *rate*	Enter the keyword `rate-limit` followed by a number for the rate-limit for tunneled packets on the VMAN. The range is from 64 to 320.
stp	Enter the keyword `stp` to enable protocol tunneling on a spanning tree, including STP, MSTP, RSTP, and PVST.

Defaults none

Command Modes CONF-IF-VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guid*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.1	Added support for `802.1X`, `E-LMI`, `GMRP`, `GVRP`, `LLDP`, `LACP`, `MMRP`, `MVRP`, and `OAM 802.3ah` protocol traffic to the E-Series ExaScale.
Version 8.2.1.0	Introduced on the C-Series, E-Series, and E-Series ExaScale.
Version 7.4.1.0	Introduced

Example

```
Dell#conf
Dell(conf)#interface vlan 2
Dell(conf-if-vl-2)#vlan-stack compatible
Dell(conf-if-vl-2)#member Gi1/2-3
Dell(conf-if-vl-2)#protocol-tunnel stp
Dell(conf-if-vl-2)#protocol-tunnel enable
```

Related Command

show protocol-tunnel — displays tunneling information for all VLANs.

protocol-tunnel destination-mac

Overwrite the BPDU destination MAC address with a specific value.

S6000

Syntax `protocol-tunnel destination-mac` *`xstp address`*

Parameters

stp	Change the default destination MAC address used for L2PT to another value.

Defaults	The default destination MAC is 01:01:e8:00:00:00.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series, and S-Series.
Version 7.4.1.0	Introduced

Usage Information	When you enable VLAN-Stacking, no protocol packets are tunneled.
Related Command	show protocol-tunnel — displays tunneling information for all VLANs.

protocol-tunnel enable

Enable protocol tunneling globally on the system.

S6000

Syntax	`protocol-tunnel enable` To disable protocol tunneling, use the `no protocol-tunnel enable` command.
Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.4.1.0	Introduced

Usage Information Dell Networking OS must have the default CAM profile with the default microcode before you enable L2PT.

protocol-tunnel rate-limit

Enable traffic rate limiting per box.

S6000

Syntax `protocol-tunnel rate-limit` *`rate`*

To reset the rate limit to the default, use the `no protocol-tunnel rate-limit` *`rate`* command.

Parameters

rate	Enter the rate in frames per second. The range is from 75 to 3000. The default is **75**.

Defaults **75** frames per second.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series, E-Series TeraScale, and E-Series ExaScale. Maximum rate limit on E-Series reduced from 4000 to 3000.
Version 7.4.1.0	Introduced

Example

```
Dell#
Dell#conf
Dell(conf)#protocol-tunnel rate-limit 1000
Dell(conf)#
```

Related Commands	show protocol-tunnel — displays tunneling information for all VLANs. show running-config — displays the current configuration.

show protocol-tunnel

Display protocol tunnel information for all or a specified VLAN-Stack VLAN.

S6000

Syntax	`show protocol-tunnel [vlan vlan-id]`
Parameters	**vlan *vlan-id*** — (OPTIONAL) Enter the keyword `vlan` then the VLAN ID to display information for the one VLAN. The range is from 1 to 4094.
Defaults	none
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series, E-Series and E-Series ExaScale.
Version 7.4.1.0	Introduced

Example

```
Dell#show protocol-tunnel
System Rate-Limit: 75 frames/second
VLAN  Protocols   Interface
1000  STP,PVST    Gi 5/7,Gi 5/6
1001  LLDP,GVRP   Gi 5/7,Gi 5/6
1002  MMRP,MVRP   Gi 5/7,Gi 5/6
1003  LACP,DOT1X  Gi 5/7,Gi 5/6
1004  OAM,PAUSE   Gi 5/7,Gi 5/6
1005  E-LMI       Gi 5/7,Gi 5/6
```

Example (Specific VLAN)

```
Dell#show protocol-tunnel vlan 2
System Rate-Limit: 1000 Frames/second
Interface  Vlan  Protocol(s)
```

```
Gi1/2       2      STP, PVST
Dell#
```

Related Commands

show running-config — displays the current configuration.

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sFlow

The Dell Networking operating software (OS) supports sFlow commands on the S6000 platform.

Dell Networking operating software sFlow monitoring system includes an sFlow Agent and an sFlow Collector.

- The sFlow Agent combines the flow samples and interface counters into sFlow datagrams and forwards them to the sFlow Collector.
- The sFlow Collector analyses the sFlow Datagrams received from the different devices and produces a network-wide view of traffic flows.

Important Points to Remember

- Dell Networking recommends that the sFlow Collector be connected to the Dell Networking chassis through a line card port rather than the route processor module (RPM) Management Ethernet port.
- Dell Networking operating software exports all sFlow packets to the sFlow Collector. A small sampling rate can equate to many exported packets. A backoff mechanism is automatically applied to reduce this amount. Some sampled packets may be dropped when the exported packet rate is high and the backoff mechanism is about to or is starting to take effect. The dropEvent counter, in the sFlow packet, is always zero.
- sFlow sampling is done on a per-port basis.
- Community list and local preference fields are not filled up in the extended gateway element in the sFlow datagram.
- The 802.1P source priority field is not filled up in the extended switch element in the sFlow datagram.
- Only Destination and Destination Peer AS numbers are packed in the dst-as-path field in the extended gateway element.
- If the packet being sampled is redirected using policy-based routing (PBR), the sFlow datagram may contain incorrect extended gateway/router information.
- sFlow does not support packing extended information for IPv6 packets. Only the first 128 bytes of the IPv6 packet is shipped in the datagram.
- The source virtual local area network (VLAN) field in the extended switch element is not packed if there is a routed packet.
- The destination VLAN field in the extended switch element is not packed if there is a multicast packet.
- The sFlow sampling functionality is supported only for egress traffic and not for ingress traffic.
- The maximum number of packets that can be sampled and processed per second is:
  - 7500 packets when no extended information packing is enabled.
  - 7500 packets when only extended-switch information packing is enabled (refer to sflow extended-switch enable).

sflow collector

Configure a collector device to which sFlow datagrams are forwarded.

S6000

Syntax

`sflow collector {ip-address | ipv6-address} agent-addr {ip-address | ipv6-address} [number [max-datagram-size number]] | [max-datagram-size number] [vrf management]`

To delete a configured collector, use the `no sflow collector {ip-address | ipv6-address} agent-addr {ipv4-address | ipv6-address} [number [max-datagram-size number]] | [max-datagram-size number] [vrf management]` command.

Parameters

sflow collector *ip-address* | *ipv6-address*	Enter the IP address of the collector in dotted decimal format for IPv4 or x:x:x:x::x format for IPv6. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
agent-addr *ip-address* | *ipv6-address*	Enter the keyword `agent-addr` followed by the sFlow agent IP address in dotted decimal format for IPv4 or x:x:x:x::x format for IPv6. **NOTE:** The :: notation specifies successive hexadecimal fields of zeros.
number	(OPTIONAL) Enter the user datagram protocol (UDP) port number. The range is from 0 to 65535. The default is 6343.
max-datagram-size *number*	(OPTIONAL) Enter the keyword max-datagram-size then the size number in bytes. The range is from 400 to 1500. The default is **1400**.
vrf management	(OPTIONAL) Enter the keyword `vrf` followed by the keyword `management` to configure the collector device corresponding to the default VRF and the management VRF respectively.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.2.3	Added support for IPv6 sFlow collectors and agents on the E-series TeraScale, C-Series, and S-Series.
Version 8.4.1.1	Added support for IPv6 sFlow collectors and agents on the E-series ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 6.5.1.0	Expanded the `no` form of the command to mirror the syntax used to configure.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

You can configure up to two sFlow collectors (IPv4 or IPv6). If two collectors are configured, traffic samples are sent to both.

The sFlow agent address is carried in a field in SFlow packets and is used by the collector to identify the sFlow agent.

In sFlow, the agent address is a single invariant IPv4 or IPv6 address used to identify the agent to the collector. It is usually assigned the address of a loopback interface on the agent, which provides invariance. The agent address is carried as a field in the payload of the sFlow packets.

As part of the sFlow-MIB, if the SNMP request originates from a configured collector, Dell Networking OS returns the corresponding configured agent IP in the MIB requests. Dell Networking OS checks to ensure that two entries are not configured for the same collector IP with a different agent IP. Should that happen, Dell Networking OS generates the following error: `%Error: Different agent-addr attempted for an existing collector`.

Example

```
Dell(conf)#sflow collector 10.1.1.25 agent-addr 10.1.1.10 vrf
management
```

sflow enable (Global)

Enable sFlow globally.

S6000

Syntax	`sflow enable` To disable sFlow, use the `no sflow enable` command.
Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information	sFlow is disabled by default. In addition to this command, sFlow needs to be enable on individual interfaces where sFlow sampling is desired.
Related Commands	sflow enable (Interface) — enables sFlow on interfaces.

sflow enable (Interface)

Enable sFlow on interfaces.

S6000

Syntax	`sflow enable` To disable sFlow, use the `no sflow enable` command.

Defaults

Disabled.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

When you enable sFlow on an interface, flow sampling is done on any traffic going out of the interface.

NOTE: After a physical port is a member of a LAG, it inherits the sFlow configuration from the LAG port.

Related Commands

sflow enable (Global) — turns sFlow on globally.

sflow extended-switch enable

Enable packing information on a switch only.

S6000

Syntax

`sflow extended-switch enable`

To disable packing information, use the `no sflow extended-switch [enable]` command.

Parameters

enable	Enter the keyword `enable` to enable global extended information.

Defaults Disabled.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information Dell Networking OS enhances the sflow implementation for real time traffic analysis on the E-Series to provide extended gateway information in cases where the destination IP addresses are learned by different routing protocols and for cases where the destination is reachable over ECMP.

Related Commands show sflow — displays the sFlow configuration.

sflow polling-interval (Global)

Set the sFlow polling interval at a global level.

S6000

Syntax `sflow polling-interval interval value`

To return to the default, use the `no sflow polling-interval interval` command.

Parameters

interval value	Enter the interval value in seconds. The range is from 15 to 86400 seconds. The default is **20 seconds**.

Defaults **20 seconds**

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information

The polling interval for an interface is the maximum number of seconds between successive samples of counters sent to the collector. This command changes the global default counter polling (20 seconds) interval. You can configure an interface to use a different polling interval.

Related Commands

sflow polling-interval (Interface) — sets the polling interval for an interface.

sflow polling-interval (Interface)

Set the sFlow polling interval at an interface (overrides the global-level setting.)

S6000

Syntax

`sflow polling-interval interval value`

To return to the default, use the `no sflow polling-interval interval` command.

Parameters

interval value	Enter the interval value in seconds. The range is from 15 to 86400 seconds. The default is **the global counter polling interval**.

Defaults

The same value as the current global default counter polling interval.

Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information	This command sets the counter polling interval for an interface.
Related Commands	sflow polling-interval (Global) — globally sets the polling interval.

sflow sample-rate (Global)

Change the global default sampling rate.

S6000

Syntax

```
sflow sample-rate value
```

To return to the default sampling rate, use the `no sflow sample-rate` command.

Parameters

value	Enter the sampling rate value. For the C-Series and S-Series, the range is from 256 to 8388608 packets Enter values in powers of 2 only; for example, 4096, 8192, 16384, and so on. The default is **32768 packets**.

Defaults **32768 packets**

Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 7.4.1.0	Introduced on the E-Series.

Usage Information	Sample-rate is the average number of packets skipped before the sample is taken. This command changes the global default sampling rate. You can configure an interface to use a different sampling rate than the global sampling rate. If the value entered is not a correct power of 2, the command generates an error message with the previous and next power of 2 value. Select one of these two packet numbers and re-enter the command.
Related Commands	sflow sample-rate (Interface) — changes the interface sampling rate.

sflow sample-rate (Interface)

Change the interface default sampling rate.

S6000

Syntax	`sflow sample-rate` *`value`* To return to the default sampling rate, use the `no sflow sample-rate` command.

Parameters

value	Enter the sampling rate value. For the C-Series and S-Series, the range is from 256 to 8388608 packets. Enter values in powers of 2 only; for example, 4096, 8192, 16384, etc. The default is **32768** packets.

Defaults	The Global default sampling.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information	This command changes the sampling rate for an interface. By default, the sampling rate of an interface is set to the same value as the current global default sampling rate. If the value entered is not a correct power of 2, the command generates an error message with the previous and next power-of-2 value. Select one of these two number and re-enter the command.
Related Commands	sflow sample-rate (Global) — changes the sampling rate globally.

show sflow

Display the current sFlow configuration.

S6000

Syntax `show sflow [interface]`

Parameters

interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information.

- For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
- For a Port-Channel Ethernet interface, enter the keyword `port-channel` then the slot/port information. The range is from 1 to 128.
- For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on S-Series Stacking.
Version 8.1.1.0	Introduced on the E-Series ExaScale.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.6.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The dropEvent counter (sFlow samples dropped due to sub-sampling) shown in the following example always displays a value of zero.

Example

```
Dell#show sflow
sFlow services are enabled
Egress Mangement Interface sFlow services are disabled
Global default sampling rate: 2048
Global default counter polling interval: 20
Global extended information enabled: none
0 collectors configured
0 UDP packets exported
0 UDP packets dropped
0 sFlow samples collected

stack-unit 0 Port set 0
  Te 0/0: configured rate 256, actual rate 256
Dell#
Dell#show running-config sflow
!
sflow enable
sflow sample-rate 2048
```

```
Dell#show  running-config interface tengigabitethernet 0/0
!
interface TenGigabitEthernet 0/0
 no ip address
 sflow enable
 sflow sample-rate 256
 no shutdown
```

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Simple Network Management Protocol (SNMP) and Syslog

This chapter contains commands to configure and monitor the simple network management protocol (SNMP) v1/v2/v3 and Syslog. Both features are supported on the S6000 platform.

The chapter contains the following sections:

- SNMP Commands
- Syslog Commands

SNMP Commands

The following SNMP commands are available in the Dell Networking operating software.

The simple network management protocol (SNMP) is used to communicate management information between the network management stations and the agents in the network elements. Dell Networking OS supports SNMP versions 1, 2c, and 3, supporting both read-only and read-write modes. Dell Networking OS sends SNMP traps, which are messages informing an SNMP management system about the network. Dell Networking OS supports up to 16 SNMP trap receivers.

Important Points to Remember

- Typically, 5-second timeout and 3-second retry values on an SNMP server are sufficient for both LAN and WAN applications. If you experience a timeout with these values, the recommended best practice on Dell Networking switches (to accommodate their high port density) is to increase the timeout and retry values on your SNMP server to the following:
  - SNMP Timeout — greater than 3 seconds.
  - SNMP Retry count — greater than 2 seconds.
- If you want to query an E-Series switch using SNMP v1/v2/v3 with an IPv6 address, configure the IPv6 address on a non-management port on the switch.
- If you want to send SNMP v1/v2/v3 traps from an E-Series using an IPv6 address, use a non-management port.
- SNMP v3 informs are not currently supported with IPv6 addresses.
- If you are using access control lists (ACLs) in an SNMP v3 configuration, group ACL overrides user ACL if the user is part of that group.
- SNMP operations are not supported on a virtual local area network (VLAN).

show snmp

Display the status of SNMP network elements.

S6000

Syntax	`show snmp`
Command Modes	EXEC EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example

```
Dell#show snmp
  32685 SNMP packets input
      0 Bad SNMP version errors
      0 Unknown community name
      0 Illegal operation for community name supplied
      0 Encoding errors
  96988 Number of requested variables
      0 Number of altered variables
  31681 Get-request PDUs
    968 Get-next PDUs
      0 Set-request PDUs
  61727 SNMP packets output
      0 Too big errors (Maximum packet size 1500)
      9 No such name errors
      0 Bad values errors
      0 General errors
  32649 Response PDUs
  29078 Trap PDUs
Dell#
```

Related Commands

snmp-server community — enables the SNMP and set community string.

show snmp engineID

Display the identification of the local SNMP engine and all remote engines that are configured on the router.

S6000

Syntax `show snmp engineID`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Example

```
Dell#show snmp engineID
Local SNMP engineID: 0000178B02000001E80214A8
Remote Engine ID       IP-addr      Port
80001F88043132333435   172.31.1.3   5009
80001F88043938373635   172.31.1.3   5008

Dell#
```

Related Commands

snmp-server engineID — configures local and remote SNMP engines on the router.

show snmp group

Display the group name, security model, status, and storage type of each group.

S6000

Syntax `show snmp group`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The following Example displays a group named *ngroup*. The *ngroup* has a security model of version 3 (v3) with authentication (`auth`), the read and notify name is *nview* with no write view name specified, and finally the row status is active.

Example

```
Dell#show snmp group
groupname: v1v2creadg     security model: v1
readview : v1v2cdefault   writeview: no write view specified
notifyview: v1v2cdefault  context: no context specified
row status: active
Dell#
```

Related Commands

snmp-server group — configures an SNMP server group.

show snmp user

Display the information configured on each SNMP user name.

S6000

Syntax

`show snmp user`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example

```
Dell#show snmp user
  User name: v1v2creadu
  Engine ID: 0000178B02000001E80214A8
  storage-type: nonvolatile     active
  Authentication Protocol: None
  Privacy Protocol: None

Dell#
```

snmp ifmib ifalias long

Display the entire description string through the Interface MIB, which would be truncated otherwise to 63 characters.

S6000

Syntax `snmp ifmib ifalias long`

Defaults Interface description truncated beyond 63 characters.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
unknown	Introduced on the E-Series.

Example

```
Dell#config!------command run on host connected to switch:
--------------!
```

```
> snmpwalk -c public 10.10.10.130 .1.3.6.1.2.1.31 | grep -i
alias | more
IF-MIB::ifAlias.134530304 = STRING: This is a port connected
to Router2. This
is a port connected to
IF-MIB::ifAlias.134792448 = STRING:

!------command run on Dell Networkingswitch: --------------!
Dell#snmp ifmib ifalias long

!------command run on server connected to switch:
--------------!
> snmpwalk -c public 10.10.10.130 .1.3.6.1.2.1.31 | grep -i
alias | more
IF-MIB::ifAlias.134530304 = STRING: This is a port connected
to Router2. This
is a port connected to Router2. This is a port connected to
Router2. This is a
port connected to Router2. This is a port connected to Router2.
IF-MIB::ifAlias.134792448 = STRING:
Dell#config
```

snmp-server community

Configure a new community string access for SNMPv1 v2 and v3.

S6000

Syntax `snmp-server community` *`community-name`* `{ro | rw} [ipv6` *`ipv6-access-list-name`* `[ipv6` *`ipv6-access-list-name`* `|` *`access-list-name`* `| security-name` *`name`*`] | security-name` *`name`* `[ipv6` *`ipv6-access-list-name`* `|` *`access-list-name`* `| security-name` *`name`*`] |` *`access-list-name`* `[ipv6` *`ipv6-access-list-name`* `|` *`access-list-name`* `| security-name` *`name`*`]]]`

To remove access to a community, use the `no snmp-server community` *`community-string`* `{ro | rw} [security-name` *`name`* `[`*`access-list-name`* `| ipv6` *`access-list-name`* `|` *`access-list-name`* `ipv6` *`access-list-name`*`]]` command.

Parameters

community-name	Enter a text string (up to 20 characters long) to act as a password for SNMP.
ro	Enter the keyword `ro` to specify read-only permission.
rw	Enter the keyword `rw` to specify read-write permission.
ipv6 *access-list-name*	(Optional) Enter the keyword `ipv6` then an IPv6 ACL name (a string up to 16 characters long).
security-name *name*	(Optional) Enter the keywords `security-name` then the security name as defined by the community MIB.
access-list-name	(Optional) Enter a standard IPv4 access list name (a string up to 16 characters long).

Defaults none

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information The following example configures a community named *public* that is mapped to the security named *guestuser* with Read Only (`ro`) permissions.

The `security-name` parameter maps the community string to an SNMPv3 user/security name as defined by the community MIB.

If a community string is configured without a `security-name` (for example, `snmp-server community public ro`), the community is mapped to a default security-name/group:

- `v1v2creadu / v1v2creadg` — maps to a community with `ro` (read-only) permissions.
- `v1v2cwriteu/ v1v2cwriteg` — maps to a community with `rw` (read-write) permissions.

The `community-name` parameter indexes this command.

If you do not configure the `snmp-server community` command, you cannot query SNMP data. Only Standard IPv4 ACL and IPv6 ACL is supported in the optional `access-list-name`.

The command options `ipv6`, `security-name`, and `access-list-name` are recursive. In other words, each option can, in turn, accept any of the three options as a sub-option, and each of those sub-options can accept any of the three sub-options as a sub-option, and so forth. The second Example shows the creation of a standard IPv4 ACL called *snmp-ro-acl* and then assigning it to the SNMP community *guest*.

NOTE: For IPv6 ACLs, only IPv6 and UDP types are valid for SNMP; TCP and ICMP rules are not valid for SNMP. In IPv6 ACLs, port rules are not valid for SNMP.

Example

```
Dell#config
Dell(conf)# snmp-server community public ro
Dell(conf)# snmp-server community guest ro security-name
guestuser
Dell(conf)#
```

Example

```
Dell(conf)# ip access-list standard snmp-ro-acl
Dell(config-std-nacl)#seq 5 permit host 10.10.10.224
Dell(config-std-nacl)#seq 10 deny any count
!

Dell(conf)#snmp-server community guest ro snmp-ro-acl
Dell(conf)#
```

Related Commands

ip access-list standard — names (or selects) a standard access list to filter based on IP address.

ipv6 access-list — configures an access list based on IPv6 addresses or protocols.

show running-config — displays the current SNMP configuration and defaults.

snmp-server contact

Configure contact information for troubleshooting this SNMP node.

S6000

Syntax

`snmp-server contact text`

To delete the SNMP server contact information, use the `no snmp-server contact` command.

Parameters

text	Enter an alphanumeric text string, up to 55 characters long.

Defaults none

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

snmp-server enable traps

Enable SNMP traps.

S6000

Syntax

`snmp-server enable traps [notification-type] [notification-option]`

To disable traps, use the `no snmp-server enable traps [notification-type] [notification-option]` command.

Parameters

notification-type — Enter the type of notification from the following list:

- `bgp` — Notification of changes in the BGP process.
- `config` — Notification of changes to the startup or running configuration.
- `ecfm` — Notification of changes to ECFM.
- `ecmp` — Enable an ECMP trap to notify of ECMP or link bundle traffic imbalances.
- `envmon` — For Dell Networking device notifications when an environmental threshold is exceeded.
- `isis` — Notification of intermediate service traps.
- `lacp` — Notification of changes.
- `snmp` — Notification of RFC 1157 traps.
- `stp` — Notification of a state change in the spanning tree protocol (RFC 1493).
- `vlt` — Notification of virtual link trunking.
- `vrrp` — Notification of a state change in a VRRP group.
- `xstp` — Notification of a state change in MSTP (802.1s), RSTP (802.1w), and PVST+.

notification-option — For the `envmon` notification-type, enter one of the following optional parameters:

- `cam-utilization`
- `fan`

- `supply`
- `temperature`

For the `snmp` notification-type, enter one of the following optional parameters:

- `authentication`
- `coldstart`
- `linkdown`
- `linkup`

Defaults

Not enabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.1(0.0)	Added support for copy-config and ecmp traps.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.1.0	Added support for VRRP traps.
Version 7.6.1.0	Added support for STP and xSTP traps. Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

Dell Networking OS supports up to 16 SNMP trap receivers.

If you do not configure this command, no traps controlled by this command are sent. If you do not specify a `notification-type` and `notification-option`, all traps are enabled.

Related Commands

snmp-server community — enables SNMP and sets the community string.

snmp-server engineID

Configure the name for both the local and remote SNMP engines on the router.

S6000

Syntax

`snmp-server engineID [local` *engineID*`] [remote` *ip-address* `vrf` *vrf-name* `udp-port` *port-number engineID*`]`

To return to the default, use the `no snmp-server engineID [local` *engineID*`] [remote` *ip-address* `vrf` *vrf-name* `udp-port` *port-number engineID*`]` command.

Parameters

local *engineID*	Enter the keyword `local` followed by the engine ID number that identifies the copy of the SNMP on the local device. Format (as specified in RFC 3411): 12 octets. • The first four octets are set to the private enterprise number. • The remaining eight octets are the MAC address of the chassis.
remote *ip-address*	Enter the keyword `remote` followed by the IP address that identifies the copy of the SNMP on the remote device.
vrf *vrf-name*	Enter the keyword `vrf` followed by the name of the VRF that is used to reach the device. NOTE: Use this attribute to specify the VRF that is used by the SNMP engine to reach the device. If no VRF is specified, then the default VRF is used.
udp-port *port-number engineID*	Enter the keywords `udp-port` followed by the user datagram protocol (UDP) port number on the remote device. The range is from 0 to 65535. The default is **162**.

Defaults

As above.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

Changing the value of the SNMP Engine ID has important side effects. A user's password (entered on the command line) is converted to a message digest algorithm (MD5) or secure hash algorithm (SHA) security digest. This digest is based on both the password and the local Engine ID. The command line password is then destroyed, as required by RFC 2274. Because of this deletion, if the local value of the Engine ID changes, the security digests of SNMPv3 users is invalid and the users will have to be reconfigured.

For the remote Engine ID, the host IP and UDP port are the indexes to the command that are matched to either overwrite or remove the configuration.

Related Commands

show snmp engineID — displays the SNMP engine and all the remote engines that are configured on the router.

show running-config snmp — displays the SNMP running configuration.

snmp-server group

Configure a new SNMP group or a table that maps SNMP users to SNMP views.

S6000

Syntax

`snmp-server group [`*`group_name`*` {1 | 2c | 3 {auth | noauth | priv}}] [read `*`name`*`] [write `*`name`*`] [notify `*`name`*`] [access `*`access-list-name`*` | ipv6 `*`access-list-name`*` | `*`access-list-name`*` ipv6 `*`access-list-name`*`]]`

To remove a specified group, use the `no snmp-server group [`*`group_name`*` {v1 | v2c | v3 {auth | noauth | priv}}] [read `*`name`*`] [write `*`name`*`] [notify `*`name`*`] [access `*`access-list-name`*` | ipv6 `*`access-list-name`*` | `*`access-list-name`*` ipv6 `*`access-list-name`*`]]` command.

Parameters

group_name	Enter a text string (up to 20 characters long) as the name of the group. The following groups are created for mapping to read/write community/security-names (defaults):

	• `v1v2creadg` — maps to a community/security-name with `ro` permissions. • `1v2cwriteg` — maps to a community/security-name `rw` permissions.
1 | 2c | 3	(OPTIONAL) Enter the security model version number (`1`, `2c`, or `3`): • `1` is the least secure version. • `3` is the most secure of the security modes. • `2c` allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed. The default is **1**.
auth	(OPTIONAL) Enter the keyword `auth` to specify authentication of a packet without encryption.
noauth	(OPTIONAL) Enter the keyword `noauth` to specify no authentication of a packet.
priv	(OPTIONAL) Enter the keyword `priv` to specify both authentication and then scrambling of the packet.
read *name*	(OPTIONAL) Enter the keyword `read` then a name (a string of up to 20 characters long) as the read view name. The default is **GlobalView** and is assumed to be every object belonging to the internet (1.3.6.1) OID space.
write *name*	(OPTIONAL) Enter the keyword `write` then a name (a string of up to 20 characters long) as the write view name.
notify *name*	(OPTIONAL) Enter the keyword `notify` then a name (a string of up to 20 characters long) as the notify view name.
access *access-list-name*	(Optional) Enter the standard IPv4 access list name (a string up to 16 characters long).
ipv6 *access-list-name*	(Optional) Enter the keyword `ipv6` then the IPv6 access list name (a string up to 16 characters long).
access-list-name ipv6 *access-list-name*	(Optional) Enter both an IPv4 and IPv6 access list name.

Defaults	As above.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.2	Added support for the `access` parameter.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The following Example specifies the group named *harig* as a version 3 user requiring both authentication and encryption and read access limited to the read named *rview*.

NOTE: The number of configurable groups is limited to 16 groups.

Example

```
Dell#conf
Dell(conf)# snmp-server group harig 3 priv read rview
Dell#
```

Related Commands

show snmp group — displays the group name, security model, view status, and storage type of each group.

show running-config — displays the SNMP running configuration.

snmp-server host

Configure the recipient of an SNMP trap operation.

S6000

Syntax

`snmp-server host` *ip-address* `|` *ipv6-address* `[vrf` *vrf-name*`] traps | informs [version 1 | 2c | 3] [auth | no auth | priv] [`*community-string*`] [udp-port` *port-number*`] [`*notification-type*`]`

To remove the SNMP host, use the `no snmp-server host` *ip-address* `[vrf` *vrf-name*`] traps | informs [version 1 | 2c | 3] [auth | noauth | priv] [`*community-string*`] [udp-port` *number*`] [`*notification-type*`]` command.

Parameters

ip-address	Enter the keyword `host` then the IP address of the host (configurable hosts is limited to 16).

ipv6-address	Enter the keyword host then the IPv6 address of the host in the x:x:x:x::x format. NOTE: The :: notation specifies successive hexadecimal fields of zero.
vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF that the SNMP server uses to connect to the host. NOTE: You can use this attribute to inform the SNMP engine about the vrf instance to be used to reach the corresponding remote host to send Trap or Inform message. If no VRF is specified, then the default VRF is used.
traps	(OPTIONAL) Enter the keyword `traps` to send trap notifications to the specified host. The default is **traps**.
informs	(OPTIONAL) Enter the keyword `informs` to send inform notifications to the specified host. The default is **traps**.
version 1 | 2c | 3	(OPTIONAL) Enter the keyword version to specify the security model then the security model version number `1`, `2c`, or `3`: • Version `1` is the least secure version. • Version `3` is the most secure of the security modes. • Version `2c` allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed. The default is version **1**.
auth	(OPTIONAL) Enter the keyword `auth` to specify authentication of a packet without encryption.
noauth	(OPTIONAL) Enter the keyword `noauth` to specify no authentication of a packet.
priv	(OPTIONAL) Enter the keyword `priv` to specify both authentication and then scrambling of the packet.
community-string	Enter a text string (up to 20 characters long) as the name of the SNMP community. NOTE: For version 1 and version 2c security models, this string represents the name of the SNMP community. The string can be set using this command; however, Dell Networking OS recommends setting the community string using the `snmp-server community` command before executing this command. For version 3 security model, this string is the USM user security name.

udp-port *port-number*	(OPTIONAL) Enter the keywords `udp-port` followed by the port number of the remote host to use. The range is from 0 to 65535. The default is **162**.
notification-type	(OPTIONAL) Enter one of the following keywords for the type of trap to be sent to the host: • `bgp` — Enable BGP state change traps. • `ecfm` — Enable ECFM state change traps. • `entity` — Enable entity change traps. • `envmon` — Enable SNMP environmental monitor traps. • `eoam` — Enable EOAM state change traps • `ets` — Enable ets traps • `fips` — Enable FIP Snooping state change traps • `lacp` — Enable LACP state change traps. • `isis` — Enable ISIS adjacency change traps • `pfc` — Enable pfc traps • `snmp` — Enable SNMP trap • `stp` — Enable 802.1d state change traps • `vlt` — Enable VLT traps • `vrrp` — Enable VRRP state change traps • `xstp` — Enable 802.1s, 802.1w, and PVST+ state change traps The default is all trap types are sent to host.

Defaults As above.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.1(0.0)	Added support for config and ecmp traps.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.4.1.0	Added support for VRRP traps.
Version 7.6.1.0	Added support for STP and xSTP notification types. Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

In order to configure the router to send SNMP notifications, enter at least `one snmp-server host` command. If you enter the command with no keywords, all trap types are enabled for the host. If you do not enter an `snmp-server host` command, no notifications are sent.

In order to enable multiple hosts, issue a separate `snmp-server host` command for each host. You can specify multiple notification types in the command for each host.

When multiple `snmp-server host` commands are given for the same host and type of notification (trap or inform), each succeeding command overwrites the previous command. Only the last `snmp-server host` command will be in effect. For example, if you enter an `snmp-server host inform` command for a host and then enter another `snmp-server host inform` command for the same host, the second command replaces the first command.

The `snmp-server host` command is used with the `snmp-server enable` command. Use the `snmp-server enable` command to specify which SNMP notifications are sent globally. For a host to receive most notifications, at least one `snmp-server enable` command and the `snmp-server host` command for that host must be enabled.

NOTE: For v1 / v2c trap configuration, if the community-string is not defined using the `snmp-server community` command prior to using this command, the default form of the `snmp-server community` command automatically is configured with the community-name the same as specified in the `snmp-server host` command.

Configuring Informs

To send an inform, use the following steps:

1. Configure a remote engine ID.
2. Configure a remote user.
3. Configure a group for this user with access rights.
4. Enable traps.
5. Configure a host to receive informs.

Related Commands

snmp-server enable traps — enables SNMP traps.

snmp-server community — configures a new community SNMPv1 or SNMPv2c.

snmp-server location

Configure the location of the SNMP server.

S6000

Syntax	`snmp-server location text` To delete the SNMP location, use the `no snmp-server location` command.
Parameters	*text* — Enter an alpha-numeric text string, up to 55 characters long.
Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

snmp-server packetsize

Set the largest SNMP packet size permitted. Wen the SNMP server is receiving a request or generating a reply, use the `snmp-server packetsize global configuration` command.

S6000

Syntax	`snmp-server packetsize byte-count`
Parameters	*byte-count* — Enter one of the following values 8, 16, 24 or 32. Packet sizes are 8000 bytes, 16000 bytes, 32000 bytes, and 64000 bytes.

Defaults	**8**
Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

snmp-server trap-source

Configure a specific interface as the source for SNMP traffic.

S6000

Syntax

`snmp-server trap-source *interface*`

To disable sending traps out a specific interface, use the `no snmp trap-source` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Loopback interface, enter the keyword `loopback` then a number from 0 to 16383. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults The IP address assigned to the management interface is the default.

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information To enable this `snmp-server trap-source` command, configure an IP address on the interface and enable the interface configured as an SNMP trap source.

Related Commands snmp-server community — sets the community string.

snmp-server user

Configure a new user to an SNMP group.

S6000

Syntax

```
snmp-server user name {group_name remote ip-address vrf vrf-name udp-port port-number} [1 | 2c | 3] [encrypted] [auth {md5 | sha} auth-password] [priv des56 priv password] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]
```

To remove a user from the SNMP group, use the `no snmp-server user name {group_name remote ip-address vrf vrf-name udp-port port-number} [1 | 2c | 3] [encrypted] [auth {md5 | sha} auth-password] [priv des56 priv password] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]` command.

Parameters

name	Enter the name of the user (not to exceed 20 characters), on the host that connects to the agent.
group_name	Enter a text string (up to 20 characters long) as the name of the group. The following groups are created for mapping to read/write community/security-names (defaults): • `v1v2creadu` — maps to a community with `ro` permissions. • `1v2cwriteu` — maps to a community `rw` permissions.
remote *ip-address*	Enter the keywords `udp-port` then the user datagram protocol (UDP) port number on the remote device. The range is from 0 to 65535. The default is **162**.
vrf *vrf-name*	Enter the keywords `vrf` and then the name of the VRF this is used to connect to the SNMP server. NOTE: Use this attribute to specify a VRF name that is used to connect to the remote host. If no VRF is specified, then the default VRF is used.
udp-port *port-number*	Enter the keywords `udp-port` then the UDP (User Datagram Protocol) port number on the remote device. The range is from 0 to 65535. The default is **162**.
1 | 2c | 3	(OPTIONAL) Enter the security model version number (`1`, `2c`, or `3`): • `1` is the least secure version. • `3` is the most secure of the security modes. • `2c` allows transmission of informs and counter 64, which allows for integers twice the width of what is normally allowed. The default is **1**.
encrypted	(OPTIONAL) Enter the keyword `encrypted` to specify the password appear in encrypted format (a series of digits, masking the true characters of the string).
auth	(OPTIONAL) Enter the keyword `auth` to specify authentication of a packet without encryption.
md5 | sha	(OPTIONAL) Enter the keyword `md5` or `sha` to designate the authentication level. • `md5` — Message Digest Algorithm • `sha` — Secure Hash Algorithm
auth-password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the agent to receive packets from the host. Minimum: eight characters long.

priv des56	(OPTIONAL) Enter the keywords `priv des56` to initiate a privacy authentication level setting using the CBC-DES privacy authentication algorithm (des56).
priv password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the host to encrypt the contents of the message it sends to the agent. Minimum: eight characters long.
access *access-list-name*	(Optional) Enter the standard IPv4 access list name (a string up to 16 characters long).
ipv6 *access-list-name*	(Optional) Enter the keyword `ipv6` then the IPv6 access list name (a string up to 16 characters long).
access-list-name ipv6 access-list-name	(Optional) Enter both an IPv4 and IPv6 access list name.

Defaults

As above.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

NOTE: For IPv6 ACLs, only IPv6 and UDP types are valid for SNMP. TCP and ICMP rules are not valid for SNMP. In IPv6 ACLs port rules are not valid for SNMP.

No default values exist for authentication or privacy algorithms and no default password exists. If you forget a password, you cannot recover it; the user must be reconfigured. You can specify either a plain-text password or an encrypted cypher-text password. In either case, the password is stored in the configuration in an encrypted form and displayed as encrypted in the `show running-config` command.

If you have an encrypted password, you can specify the encrypted string instead of the plain-text password. The following command is an Example of how to specify the command with an encrypted string.

NOTE: The number of configurable users is limited to 16.

Example

```
Dell# snmp-server user privuser v3group v3 encrypted auth md5
9fc53d9d908118b2804fe80e3ba8763d priv des56
d0452401a8c3ce42804fe80e3ba8763d
```

Usage Information

The following command is an example of how to enter a plain-text password as the string `authpasswd` for user `authuser` of group `v3group`.

Example

```
Dell#conf
Dell(conf)# snmp-server user authuser v3group v3 auth md5
authpasswd
```

Usage Information

The following command configures a remote user named *n3user* with a v3 security model and a security level of `authNOPriv`.

Example

```
Dell#conf
Dell(conf)# snmp-server user n3user ngroup remote 172.31.1.3
udp-port 5009 3
auth md5 authpasswd
```

Related Commands

show snmp user — displays the information configured on each SNMP user name.

snmp-server user (for AES128-CFB Encryption)

Specify that AES128-CFB encryption algorithm needs to be used for transmission of SNMP information. The Advanced Encryption Standard (AES) Cipher Feedback (CFB) 128-bit encryption algorithm is in compliance with RFC 3826. RFCs for SNMPv3 define two authentication hash algorithms, namely, HMAC-MD5-96 and HMAC-SHA1-96. These are the full forms or editions of the truncated versions, namely, HMAC-MD5 and HMAC-SHA1 authentication algorithms.

S6000

Syntax

```
snmp-server user name {group_name remote ip-address udp-port
port-number} [1 | 2c | 3] [encrypted] [auth {md5 | sha} auth-
password] [priv {des56 | aes128-cfb} priv- password] [access
access-list-name | ipv6 access-list-name | access-list-name
ipv6 access-list-name]
```

To remove a user from the SNMP group, use the `no snmp-server user` *`name`* `{`*`group_name`* `remote` *`ip-address`* `udp-port` *`port-number`*`} [1 | 2c |`

`3] [encrypted] [auth {md5 | sha} auth-password] [priv {des56 | aes128-cfb} priv-password] [access access-list-name | ipv6 access-list-name | access-list-name ipv6 access-list-name]` command.

Parameters

auth-password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the agent to receive packets from the host and to send packets to the host. Minimum: eight characters long.
aes128	(OPTIONAL) Enter the keyword `aes128` to initiate the AES128-CFB encryption algorithm for transmission of SNMP packets.
priv-password	(OPTIONAL) Enter a text string (up to 20 characters long) password that enables the host to encrypt the contents of the message it sends to the agent and to decrypt the contents of the message it receives from the agent. Minimum: eight characters long.

Defaults

If no authentication or privacy option is configured, then the messages are exchanged (attempted anyway) without any authentication or encryption.

Command Modes

CONFIGURATION

Command History

Version 9.3(0.0)	Added support for the AES128-CFB encryption algorithm on the S4820T, S4810, S6000 and Z-Series platforms

Usage Information

To enable robust, effective protection and security for SNMP packets transferred between the server and the client, you can use the `snmp-server user username group groupname 3 auth authentication-type auth-password priv aes128 priv-password` to specify that AES128-CFB encryption algorithm needs to be used.

You cannot modify the FIPS mode if SNMPv3 users are already configured and present in the system. An error message is displayed if you attempt to change the FIPS mode by using the `fips mode enable` command in Global Configuration mode. You can enable or disable FIPS mode only if SNMPv3 users are not previously set up. Otherwise, you must remove the previously configured users before you change the FIPS mode.

Example

```
Dell# snmp-server user privuser v3group v3 encrypted auth md5
9fc53d9d908118b2804fe80e3ba8763d priv aes128
d0452401a8c3ce42804fe80e3ba8763d
```

Related Commands

show snmp user — Displays the information configured on each SNMP user name.

snmp-server view

Configure an SNMPv3 view.

S6000

Syntax	`snmp-server view` *`view-name oid-tree`* `{included | excluded}` To remove an SNMPv3 view, use the `no snmp-server view` *`view-name oid-tree`* `{included | excluded}` command.

Parameters

view-name	Enter the name of the view (not to exceed 20 characters).
oid-tree	Enter the OID sub tree for the view (not to exceed 20 characters).
included	(OPTIONAL) Enter the keyword `included` to include the MIB family in the view.
excluded	(OPTIONAL) Enter the keyword `excluded` to exclude the MIB family in the view.

Defaults	none
Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

The `oid-tree` variable is a full sub-tree starting from 1.3.6 and cannot specify the name of a sub-tree or a MIB. The following Example configures a view named *rview* that allows access to all objects under 1.3.6.1.

Example	`Dell# conf` `Dell#(conf) snmp-server view rview 1.3.6.1 included`
Related Commands	show running-config snmp — displays the SNMP running configuration.

snmp-server vrf

Configures an SNMP agent to bind to a specific VRF.

Syntax

```
snmp-server vrf vrf-name
```

To undo the SNMP agent configuration, use the `no snmp-server vrf vrf-name` command.

Parameters

vrf vrf-name	Enter the keyword `vrf` and then the name of the VRF to associate an SNMP agent with that VRF.

Defaults	Not Enabled.
Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information	Use this command to bind an SNMP agent to a VRF. The SNMP agent processes the requests from the interfaces that belong to the specified VRF. If no VRF is specified, then the default VRF is used.
Related Commands	show snmp user — displays the information configured on each SNMP user name.

snmp trap link-status

Enable the interface to send SNMP link traps, which indicate whether the interface is up or down.

S6000

Syntax

```
snmp trap link-status
```

To disable sending link trap messages, use the `no snmp trap link-status` command.

Defaults	Enabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information	If the interface is expected to flap during normal usage, you could disable this command.

Syslog Commands

The following commands allow you to configure logging functions on all Dell Networking switches.

clear logging

Clear the messages in the logging buffer.

S6000

Syntax	`clear logging`
Defaults	none
Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands: show logging — displays logging settings and system messages in the internal buffer.

clear logging auditlog

Clears audit log.

Syntax: `clear logging auditlog`

Defaults: none

Command Modes: EXEC

Command History: This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL.

Example:

```
Dell(conf)#clear logging auditlog
```

Related Commands: show logging auditlog — displays audit log

default logging buffered

Return to the default setting for messages logged to the internal buffer.

S6000

Syntax: `default logging buffered`

Defaults	**size = 40960; level = 7 or debugging**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands	logging buffered — sets the logging buffered parameters.

default logging console

Return the default settings for messages logged to the console.

S6000

Syntax	`default logging console`
Defaults	**level = 7 or debugging**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

E-Series legacy command	

Related Commands	logging console — sets the logging console parameters.

default logging monitor

Return to the default settings for messages logged to the terminal.

S6000

Syntax	`default logging monitor`
Defaults	**level = 7 or debugging**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands	logging monitor — sets the logging monitor parameters. terminal monitor — sends system messages to the terminal/monitor.

default logging trap

Return to the default settings for logging messages to the Syslog servers.

S6000

Syntax	`default logging trap`
Defaults	**level = 6 or informational**

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

logging trap — limit messages logged to the Syslog servers based on severity.

logging

Configure an IP address or host name of a Syslog server where logging messages are sent. Multiple logging servers of both IPv4 and/or IPv6 can be configured.

S6000

Syntax

```
logging {ip-address | ipv6-address | hostname} {{udp {port}} |
{tcp {port}} [vrf vrf-name]
```

To disable logging, use the `no logging` command.

Parameters

ip-address	Enter the IPv4 address in dotted decimal format.
ipv6-address	Enter the IPv6 address in the x:x:x:x::X format. NOTE: The :: notation specifies successive hexadecimal fields of zeros.
hostname	Enter the name of a host already configured and recognized by the switch.
udp	Enter the keyword `udp` to enable transmission of log message over UDP followed by port number. The default port is 514
tcp	Enter the keyword `tcp` to enable transmission of log message over TCP followed by port number.

vrf *vrf-name*	(Optional) Enter the keyword `vrf` and then the name of the VRF to enable the logging process in VRF mode. NOTE: Use this attribute to specify the VRF that is used to contact the host. By default, the default VRF is used.

Defaults	Disabled.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added **udp** and **tcp** keywords for the S4810, S4820T, S6000, Z9000, and MXL.
Version 9.4.(0.0)	Added support for VRF.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.4.1.0	Added support for IPv6.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information	Multiple logging servers of both IPv4 and/or IPv6 can be configured.
Related Commands	logging on — enables the logging asynchronously to logging buffer, console, Syslog server, and terminal lines. logging trap — enables logging to the Syslog server based on severity.

logging buffered

Enable logging and specify which messages are logged to an internal buffer. By default, all messages are logged to the internal buffer.

S6000

Syntax	`logging buffered [level] [size]` To return to the default values, use the `default logging buffered` command. To disable logging stored to an internal buffer, use the `no logging buffered` command.

Parameters

level	(OPTIONAL) Indicate a value from 0 to 7 or enter one of the following equivalent words: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **7** or **debugging**.
size	(OPTIONAL) Indicate the size, in bytes, of the logging buffer. The number of messages buffered depends on the size of each message. The range is from 40960 to 524288. The default is **40960 bytes**.

Defaults	level = **7**; size = **40960 bytes**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information	When you decrease the buffer size, all messages stored in the buffer are lost. Increasing the buffer size does not affect messages stored in the buffer.
Related Commands	clear logging — clears the logging buffer. default logging buffered — returns the logging buffered parameters to the default setting. show logging — displays the logging setting and system messages in the internal buffer.

logging console

Specify which messages are logged to the console.

S6000

Syntax

`logging console [level]`

To return to the default values, use the `default logging console` command.

To disable logging to the console, use the `no logging console` command.

Parameters

level	(OPTIONAL) Indicate a value from 0 to 7 or enter one of the following parameters: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **7** or **debugging**.

Defaults

level = **7**; size = **debugging**

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

E-Series legacy command

Related Commands

clear logging — clears the logging buffer.

default logging console — returns the logging console parameters to the default setting.

show logging — displays the logging setting and system messages in the internal buffer.

logging extended

Logs security and audit events to a system log server.

Syntax

```
logging extended
```

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL.

Usage Information

This command is available with or without RBAC enabled. When RBAC is enabled you can restrict access to audit and security logs based on the CLI sessions' user roles. If extended logging is disabled, you can only view system events, regardless of RBAC user role.

When you enabled RBAC and extended logging:

- Only the system administrator role can execute this command.
- The system administrator and system security administrator roles can view security events and system events.
- The system administrator role can view audit, security, and system events.
- The network administrator and network operator roles can view system events.

Examples

```
Dell(conf)#logging extended
```

Related Commands

show logging auditlog — displays audit log, clear logging auditlog— clears audit log

logging facility

Configure the Syslog facility used for error messages sent to Syslog servers.

S6000

Syntax	`logging facility [facility-type]` To return to the default values, use the `no logging facility` command.
Parameters	*facility-type* (OPTIONAL) Enter one of the following parameters:

facility-type — (OPTIONAL) Enter one of the following parameters:

- `auth` (authorization system)
- `cron` (Cron/at facility)
- `deamon` (system deamons)
- `kern` (kernel)
- `local0` (local use)
- `local1` (local use)
- `local2` (local use)
- `local3` (local use)
- `local4` (local use)
- `local5` (local use)
- `local6` (local use)
- `local7` (local use)
- `lpr` (line printer system)
- `mail` (mail system)
- `news` (USENET news)
- `sys9` (system use)
- `sys10` (system use)
- `sys11` (system use)
- `sys12` (system use)
- `sys13` (system use)
- `sys14` (system use)
- `syslog` (Syslog process)
- `user` (user process)
- `uucp` (Unix to Unix copy process)

The default is **local7**.

Defaults	**local7**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands

logging — enables logging to a Syslog server.

logging on — enables logging.

logging history

Specify which messages are logged to the history table of the switch and the SNMP network management station (if configured).

S6000

Syntax

`logging history level`

To return to the default values, use the `no logging history` command.

Parameters

level	Indicate a value from 0 to 7 or enter one of the following equivalent words: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **4** or **warnings**.

Defaults

warnings or 4

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

When you configure the `snmp-server trap-source` command, the system messages logged to the history table are also sent to the SNMP network management station.

Related Commands

show logging — displays information logged to the history buffer.

logging history size

Specify the number of messages stored in the Dell Networking logging history table.

S6000

Syntax

`logging history size size`

To return to the default values, use the `no logging history size` command.

Parameters

size	Indicate a value as the number of messages to be stored. The range is from 0 to 500. The default is **1 message**.

Defaults

1 message

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information	When the number of messages reach the limit you set with the `logging history size` command, older messages are deleted as newer ones are added to the table.
Related Commands	show logging — displays information logged to the history buffer.

logging monitor

Specify which messages are logged to Telnet applications.

S6000

Syntax

`logging monitor [level]`

To disable logging to terminal connections, use the `no logging monitor` command.

Parameters

level	Indicate a value from 0 to 7 or enter one of the following parameters: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **7** or **debugging**.

Defaults	**7** or **debugging**
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands	default logging monitor — returns the logging monitor parameters to the default setting.

logging on

Specify that debug or error messages are asynchronously logged to multiple destinations, such as the logging buffer, Syslog server, or terminal lines.

S6000

Syntax

`logging on`

To disable logging to logging buffer, Syslog server and terminal lines, use the `no logging on` command.

Defaults

Enabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

When you use the `no logging on` command, messages are logged only to the console.

Related Commands

logging — enables logging to the Syslog server.

logging buffered — sets the logging buffered parameters.

logging console — sets the logging console parameters.

logging monitor — sets the logging parameters for the terminal connections.

logging source-interface

Specify that the IP address of an interface is the source IP address of Syslog packets sent to the Syslog server.

S6000

Syntax	`logging source-interface interface` To disable this command and return to the default setting, use the `no logging source-interface` command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For Loopback interfaces, enter the keyword `loopback` then a number from zero (0) to 16383. • For the management interface on the RPM, enter the keyword `ManagementEthernet` then the slot/port information. The slot range is from 0 to 1 and the port range is 0. • For a Port Channel interface, enter the keywords `port-channel` then a number. Tthe range is from 1 to 128. • For a ten-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information. • For VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.

Defaults	Not configured.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

Syslog messages contain the IP address of the interface used to egress the router. By configuring the `logging source-interface` command, the Syslog packets contain the IP address of the interface configured.

Related Commands

logging — enables logging to the Syslog server.

logging synchronous

Synchronize unsolicited messages and Dell Networking OS output.

S6000

Syntax

`logging synchronous [level level | all] [limit number-of-buffers]`

To disable message synchronization, use the `no logging synchronous [level level | all] [limit number-of-buffers]` command.

Parameters

all	Enter the keyword `all` to ensure that all levels are printed asynchronously.
level *level*	Enter the keyword `level` then a number as the severity level. A high number indicates a low severity level and vice versa. The range is from 0 to 7. The default is **2**.
all	Enter the keyword `all` to turn off all.
limit *number-of-buffers*	Enter the keyword `limit` then the number of buffers to be queued for the terminal after which new messages are dropped. The range is from 20 to 300. The default is **20**.

Defaults

Disabled. If enabled without the `level` or `number-of-buffers` options specified, level = **2** and number-of-buffers = **20** are the defaults.

Command Modes

LINE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information

When you enable `logging synchronous`, unsolicited messages appear between software prompts and outputs. Only the messages with a severity at or below the set level are sent to the console.

If the message queue limit is reached on a terminal line and messages are discarded, a system message appears on that terminal line. Messages may continue to appear on other terminal lines.

Related Commands

logging on — enables logging.

logging trap

Specify which messages are logged to the Syslog server based the message severity.

S6000

Syntax

`logging trap [level]`

To return to the default values, use the `default logging trap` command.

To disable logging, use the `no logging trap` command.

Parameters

level	Indicate a value from 0 to 7 or enter one of the following parameters: `emergencies`, `alerts`, `critical`, `errors`, `warnings`, `notifications`, `informational`, or `debugging`. The default is **6** or **informational**.

Defaults

6 or **informational**

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series, S55.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Usage Information	To block a type of message parameter, set the logging trap level to a lower number. For example, to block severity messages at level 6, set the level to 5.
Related Commands	logging — enables the logging to another device. logging on — enables logging.

logging version

Displays syslog messages in a RFC 3164 or RFC 5424 format.

Syntax	`logging version {0|1}`
Defaults	`0`
Command Modes	CONFIGURATION
Version 9.5(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL.
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL.

Usage Information

To display syslog messages in a RFC 3164 or RFC 5424 format, use the **log version** command in configuration mode. By default, the system log version is set to **0**.

The following describes the two supported log messages formats:

- `0` – Displays syslog messages format as described in RFC 3164, The BSD syslog Protocol
- `1` – Displays SYSLOG message format as described in RFC 5424, The Syslog Protocol

Example

```
Dell(conf)#logging version ?
<0-1> Select syslog version (default = 0)
Dell(conf)#logging version 1
```

show logging auditlog

Displays an audit log.

Syntax	`show logging auditlog`
Defaults	none
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command. Version 9.5(0.0) — Introduced on the S4810, S4820T, S6000, Z9000, and MXL.

Example

```
Dell(conf)#show logging audit
```

Related Commands: clear logging auditlog — clears audit log.

show logging

Display the logging settings and system messages logged to the internal buffer of the switch.

S6000

Syntax

```
show logging [number | history [reverse][number] | reverse
[number] | summary]
```

Parameters

number	(OPTIONAL) Enter the number of messages displayed in the output. The range is from 1 to 65535.
history	(OPTIONAL) Enter the keyword `history` to view only information in the Syslog history table.
reverse	(OPTIONAL) Enter the keyword `reverse` to view the Syslog messages in FIFO (first in, first out) order.
summary	(OPTIONAL) Enter the keyword `summary` to view a table showing the number of messages per type and per slot. Slots *7* and *8* represent RPMs.

Command Modes	- EXEC - EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Example (Partial)

```
Dell#show logging
Syslog logging: enabled
    Console logging: level debugging
    Monitor logging: level debugging
    Buffer logging: level debugging, 5604 Messages Logged,
Size (524288 bytes)
    Trap logging: level informational
Oct 8 09:25:37: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with
neighbor 223.80.255.254 closed. Hold time
expired
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
192.200.13.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
192.1.1.13 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.14.2
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
192.1.1.14 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.11.2
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.5
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.4.1.3
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.4
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.6
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
192.1.1.12 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
192.1.1.15 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 192.1.1.3
```

```
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
192.200.12.2 Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor 1.1.10.2
Up
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Session closed by
neighbor 1.1.10.2 (Hold time expired)
Oct 8 09:25:38: %RPM1:RP1 %BGP-5-ADJCHANGE: Neighbor
192.200.14.7 Up
Oct 8 09:26:25: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with
neighbor 1.1.11.2 closed. Neighbor recycled
Oct 8 09:26:25: %RPM1:RP1 %BGP-5-ADJCHANGE: Connection with
neighbor 1.1.14.2 closed. Neighbor recycled
--More--
```

Example (History)

```
Dell#show logging history
Syslog History Table: 1 maximum table entries,
saving level Warnings or higher
  SNMP notifications not Enabled
%RPM:0:0 %CHMGR-2-LINECARDDOWN - Line card 3 down - IPC timeout
Dell#
```

show logging driverlog stack-unit

Display the driver log for the specified stack member.

S6000

Syntax `show logging driverlog stack-unit` *`unit#`*

Parameters

stack-unit *unit#*	Enter the keywords `stack-unit` followed by the stack member ID of the switch for which you want to display the driver log. The range is from 0 to 7.

defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.

Version 7.6.1.0	Introduced on the S-Series.

Usage Information This command displays internal software driver information, which may be useful during troubleshooting switch initialization errors, such as a downed Port-Pipe.

terminal monitor

Configure the Dell Networking OS to display messages on the monitor/terminal.

S6000

Syntax

```
terminal monitor
```

To return to default settings, use the `terminal no monitor` command.

defaults Disabled.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
E-Series legacy command	

Related Commands logging monitor — sets the logging parameters on the monitor/terminal.

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SNMP Traps

This chapter lists the traps sent by the Dell Networking operating software. Each trap is listed by the fields Message ID, Trap Type, and Trap Option.

Message ID	Trap Type	Trap Option
COLD_START	SNMP	COLDSTART
`%SNMP-5-SNMP_COLD_START: SNMP COLD_START trap sent.`		
WARM_START	SNMP	WARMSTART
COPY_CONFIG_COMPLETE	SNMP	NONE
`SNMP Copy Config Command Completed`		
LINK_DOWN	SNMP	LINKDOWN
`%IFA-1-PORT_LINKDN: changed interface state to down:%d`		
LINK_UP	SNMP	LINKUP
`%IFA-1-PORT_LINKUP: changed interface state to up: %d`		
AUTHENTICATION_FAIL	SNMP	AUTH
`%SNMP-3-SNMP_AUTH_FAIL: SNMP Authentication failed.Request with invalid community string.`		
EGP_NEIGHBOR_LOSS	SNMP	NONE
OSTATE_DOWN	SNMP	LINKDOWN
`%IFM-1-OSTATE_DN: changed interface state to down: %s` `%IFM-5-CSTATE_DN:Changed interface Physical state to down: %s`		
OSTATE_UP	SNMP	LINKUP
`%IFM-1-OSTATE_UP: changed interface state to up:%s` `%IFM-5-CSTATE_UP: Changed interface Physical state to up: %s`		
RMON_RISING_THRESHOLD	SNMP	NONE
`%RPM0-P:CP %SNMP-4-RMON_RISING_THRESHOLD: RMON rising threshold alarm from SNMP OID <oid>`		
RMON_FALLING_THRESHOLD	SNMP	NONE

Message ID	Trap Type	Trap Option
`%RPM0-P:CP %SNMP-4-RMON_FALLING_THRESHOLD: RMON falling threshold alarm from SNMP OID <oid>`		
RMON_HC_RISHING_THRESHOLD	SNMP	NONE
`%RPM0-P:CP %SNMP-4-RMON_HC_RISING_THRESHOLD: RMON high-capacity rising threshold alarm from SNMP OID <oid>`		
RMON_HC_FALLING_THRESHOLD	SNMP	NONE
`%RPM0-P:CP %SNMP-4-RMON_HC_FALLING_THRESHOLD: RMON high-capacity falling threshold alarm from SNMP OID <oid>`		
RESV	NONE	NONE
N/A		
CHM_CARD_DOWN	ENVMON	NONE
`%CHMGR-1-CARD_SHUTDOWN: %sLine card %d down - %s` `%CHMGR-2-CARD_DOWN: %sLine card %d down - %s`		
CHM_CARD_UP	ENVMON	NONE
`%CHMGR-5-LINECARDUP: %sLine card %d is up`		
CHM_CARD_MISMATCH	ENVMON	NONE
`%CHMGR-3-CARD_MISMATCH: Mismatch: line card %d is type %s - type %s required.`		
CHM_CARD_PROBLEM	ENVMON	NONE
CHM_ALARM_CUTOFF	ENVMON	NONE
CHM_SFM_UP	ENVMON	NONE
CHM_SFM_DOWN	ENVMON	NONE
CHM_RPM_UP	ENVMON	NONE
`%RAM-6-RPM_STATE: RPM1 is in Active State` `%RAM-6-RPM_STATE: RPM0 is in Standby State`		
CHM_RPM_DOWN	ENVMON	NONE
`%CHMGR-2-RPM_DOWN: RPM 0 down - hard reset` %CHMGR-2-RPM_DOWN: RPM 0 down - card removed		
CHM_RPM_PRIMARY	ENVMON	NONE
`%RAM-5-COLD_FAILOVER: RPM Failover Completed` `%RAM-5-HOT_FAILOVER: RPM Failover Completed`		

Message ID	Trap Type	Trap Option
`%RAM-5-FAST_FAILOVER: RPM Failover Completed`		
CHM_SFM_ADD	ENVMON	NONE
`%TSM-5-SFM_DISCOVERY: Found SFM 1`		
CHM_SFM_REMOVE	ENVMON	NONE
`%TSM-5-SFM_REMOVE: Removed SFM 1`		
CHM_MAJ_SFM_DOWN	ENVMON	NONE
`%CHMGR-0-MAJOR_SFM: Major alarm: Switch fabric down`		
CHM_MAJ_SFM_DOWN_CLR	ENVMON	NONE
`%CHMGR-5-MAJOR_SFM_CLR: Major alarm cleared: Switch fabric up`		
CHM_MIN_SFM_DOWN	ENVMON	NONE
`%CHMGR-2-MINOR_SFM: MInor alarm: No working standby SFM`		
CHM_MIN_SFM_DOWN_CLR	ENVMON	NONE
`%CHMGR-5-MINOR_SFM_CLR: Minor alarm cleared: Working standby SFM present`		
CHM_PWRSRC_DOWN	ENVMON	SUPPLY
`%CHMGR-2-PEM_PRBLM: Major alarm: problem with power entry module %s`		
CHM_PWRSRC_CLR	ENVMON	SUPPLY
`%CHMGR-5-PEM_OK: Major alarm cleared: power entry module %s is good`		
CHM_MAJ_ALARM_PS	ENVMON	SUPPLY
`%CHMGR-0-MAJOR_PS: Major alarm: insufficient power %s`		
CHM_MAJ_ALARM_PS_CLR	ENVMON	SUPPLY
`%CHMGR-5-MAJOR_PS_CLR: major alarm cleared: sufficient power`		
CHM_MIN_ALARM_PS	ENVMON	SUPPLY
`%CHMGR-1-MINOR_PS: Minor alarm: power supply non-redundant`		
CHM_MIN_ALARM_PS_CLR	ENVMON	SUPPLY
`%CHMGR-5-MINOR_PS_CLR: Minor alarm cleared: power supply redundant`		
CHM_MIN_ALRM_TEMP	ENVMON	TEMP
`%CHMGR-2-MINOR_TEMP: Minor alarm: chassis temperature`		
CHM_MIN_ALRM_TEMP_CLR	ENVMON	TEMP

Message ID	Trap Type	Trap Option
%CHMRG-5-MINOR_TEMP_CLR: Minor alarm cleared: chassis temperature normal (%s %d temperature is within threshold of %dC)		
CHM_MAJ_ALRM_TEMP	ENVMON	TEMP
%CHMGR-2-MAJOR_TEMP: Major alarm: chassis temperature high (%s temperature reaches or exceeds threshold of %dC)		
CHM_MAJ_ALRM_TEMP_CLR	ENVMON	TEMP
%CHMGR-2-MAJOR_TEMP_CLR: Major alarm cleared: chassis temperature lower (%s %d temperature is within threshold of %dC)		
CHM_FANTRAY_BAD	ENVMON	FAN
For E1200: %CHMGR-2-FAN_TRAY_BAD: Major alarm: fan tray %d is missing or down %CHMGR-2-ALL_FAN_BAD: Major alarm: all fans in fan tray %d are down. For E600 and E300: %CHMGR-2-FANTRAYBAD: Major alarm: fan tray is missing %CHMGR-2-FANSBAD: Major alarm: most or all fans in fan tray are down		
CHM_FANTRAY_BAD_CLR	ENVMON	FAN
For the E1200: %CHMGR-5-FAN_TRAY_OK: Major alarm cleared: fan tray %d present For the E600 and E300: %CHMGR-5-FANTRAYOK: Major alarm cleared: fan tray present		
CHM_MIN_FANBAD	ENVMON	FAN
For the E1200: %CHMGR-2-FAN_BAD: Minor alarm: some fans in fan tray %d are down For the E600 and E300: %CHMGR- 2-1FANBAD: Minor alarm: fan in fan tray is down		
CHM_MIN_FANBAD_CLR	ENVMON	FAN
For E1200: %CHMGR-2-FAN_OK: Minor alarm cleared: all fans in fan tray %d are good For E600 and E300: %CHMGR-5-FANOK: Minor alarm cleared: all fans in fan tray are good		
TME_TASK_SUSPEND	ENVMON	NONE
%TME-2-TASK SUSPENDED: SUSPENDED - svce:%d - inst: %d - task:%s		
TME_TASK_TERM	ENVMON	NONE

Message ID	Trap Type	Trap Option
`%TME-2-ABNORMAL_TASK_TERMINATION: CRASH - task:%s %s`		
CHM_CPU_THRESHOLD	ENVMON	NONE
`%CHMGR-5-CPU_THRESHOLD: Cpu %s usage above threshold. Cpu5SecUsage (%d)`		
CHM_CPU_THRESHOLD_CLR	ENVMON	NONE
`%CHMGR-5-CPU_THRESHOLD_CLR: Cpu %s usage drops below threshold. Cpu5SecUsage (%d)`		
CHM_MEM_THRESHOLD	ENVMON	NONE
`%CHMGR-5-MEM_THRESHOLD: Memory %s usage above threshold. MemUsage (%d)`		
CHM_MEM_THRESHOLD_CLR	ENVMON	NONE
`%CHMGR-5-MEM_THRESHOLD_CLR: Memory %s usage drops below threshold. MemUsage (%d)`		
MACMGR_STN_MOVE	ENVMON	NONE
`%MACMGR-5-DETECT_STN_MOVE: Station Move threshold exceeded for Mac %s in vlan %d`		
VRRP_BADAUTH	PROTO	NONE
`%RPM1-P:RP2 %VRRP-3-VRRP_BAD_AUTH: vrid-1 on Gi 11/12 rcvd pkt with authentication type mismatch.` `%RPM1-P:RP2 %VRRP-3-VRRP_BAD_AUTH: vrid-1 on Gi 11/12 rcvd pkt with authentication failure`		
VRRP_GO_MASTER	PROTO	NONE
`%VRRP-6-VRRP_MASTER: vrid-%d on %s entering MASTER`		
VRRP_PROTOCOL_ERROR	PROTO	NONE
`VRRP_PROTOERR: VRRP protocol error on %S`		
BGP4_ESTABLISHED	PROTO	NONE
`%TRAP-5-PEER_ESTABLISHED: Neighbor %a, state %s`		
BGP4_BACKW_XSITION	PROTO	NONE
`%TRAP-5-BACKWARD_STATE_TRANS: Neighbor %a, state %s`		

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Storm Control

The Dell Networking operating software storm control feature allows you to limit or suppress traffic during a traffic storm (Broadcast/Unknown Unicast Rate Limiting or Multicast on the C-Series and S-Series).

Storm control is supported on the Dell Networking S6000 platforms.

Important Points to Remember

- Interface commands can only be applied on physical interfaces (virtual local area networks [VLANs] and link aggregation group [LAG] interfaces are not supported).
- An INTERFACE-level command only supports storm control configuration on ingress.
- An INTERFACE-level command overrides any CONFIGURATION-level ingress command for that physical interface, if both are configured.
- You can apply the CONFIGURATION-level storm control commands at ingress or egress and are supported on all physical interfaces.
- When storm control is applied on an interface, the percentage of storm control applied is calculated based on the advertised rate of the line card. It is not based on the speed setting for the line card.
- Do not apply per-VLAN quality of service (QoS) on an interface that has storm control enabled (either on an interface or globally).
- When you enable broadcast storm control on an interface or globally on ingress, and DSCP marking for a DSCP value 1 is configured for the data traffic, the traffic goes to queue 1 instead of queue 0.
- Similarly, if you enable unicast storm control on an interface or globally on ingress, and DSCP marking for a DSCP value 2 is configured for the data traffic, the traffic goes to queue 2 instead of queue 0.

NOTE: Bi-directional traffic (unknown unicast and broadcast) along with egress storm control causes the configured traffic rates split between the involved ports. The percentage of traffic that each port receives after the split is not predictable. These ports can be in the same/different port pipes or the same/different line cards.

NOTE: The policy discard drop counters are common across storm-control drops, ACL drops and QoS drops. Therefore, if your configuration includes ACL and QoS, those drops are also computed and displayed in the policy discard drops counter field along with storm-control drops. The packets dropped by the storm control feature can be monitored by viewing the value of the Policy Discard Drops field of the output of the `show hardware stack-unit 0 drops` command.

show storm-control broadcast

Display the storm control broadcast configuration.

S6000

Syntax	`show storm-control broadcast [`*`interface`*`]`
Parameters	*interface* — (OPTIONAL) Enter one of the following interfaces to display the interface-specific storm control configuration: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • Fast Ethernet is not supported.
Defaults	none
Command Modes	• EXEC • EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced on the E-Series.

show storm-control multicast

Display the storm control multicast configuration.

S6000

Syntax	`show storm-control multicast [interface]`

Parameters

interface	(OPTIONAL) Enter one of the following interfaces to display the interface specific storm control configuration: • For Fast Ethernet, enter the keyword `Fastethernet` then the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/ port information.

Defaults: none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-Series and S-Series.

Example

```
Dell#show storm-control multicast gigabitethernet 1/0

Multicast storm control configuration

Interface  Direction     Packets/Second
-----------------------------------------
Gi 1/0     Ingress       5

Dell#
```

show storm-control unknown-unicast

Display the storm control unknown-unicast configuration.

S6000

Syntax `show storm-control unknown-unicast [`*`interface`*`]`

Parameters

interface	(OPTIONAL) Enter one of the following interfaces to display the interface specific storm control configuration: • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then y the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/ port information.

Defaults none

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on ExaScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.5.1.0	Introduced on the E-Series.

storm-control broadcast (Configuration)

Configure the percentage of broadcast traffic allowed in the network.

S6000

Syntax

`storm-control broadcast [packets_per_second in]`

To disable broadcast rate-limiting, use the `no storm-control broadcast [packets_per_second in]` command.

storm-control broadcast `[`*`percentage decimal_value`* **in | out]**`| [wred-profile name]]`**[***`packets_per_second`* **in]**

To disable broadcast rate-limiting, use the **storm-control broadcast** [*percentage decimal_value* in | out] | [wred-profile name]] [*packets_per_second* **in]** command.

Parameters

percentagedecimal_value in | out	Enter the percentage of broadcast traffic allowed in or out of the network. Optionally, you can designate a decimal value percentage, for example, 55.5%. The decimal range is from .1 to .9.
wred-profile name	Enter the keyword **wred-profile** followed by the profile name to designate a wred-profile.
packets_per_second in	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults

none

Command Modes

CONFIGURATION (conf)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	E-Series Only: Added the `percentage decimal value` option.

Version 6.5.1.0	Introduced on the E-Series.

Usage Information

Broadcast storm control is valid on Layer 2/Layer 3 interfaces only. Layer 2 broadcast traffic is treated as unknown-unicast traffic.

storm-control broadcast (Interface)

Configure the percentage of broadcast traffic allowed on an interface (ingress only).

S6000

Syntax

`storm-control broadcast [packets_per_second in]`

To disable broadcast storm control on the interface, use the `no storm-control broadcast [packets_per_second in]` command.

Parameters

packets_per_second in	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults

none

Command Modes

INTERFACE (conf-if-*interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	E-Series Only: Added the `percentage decimal value` option.
Version 6.5.1.0	Introduced on the E-Series.

storm-control multicast (Configuration)

Configure the packets per second (pps) of multicast traffic allowed into the C-Series and S-Series networks only.

S6000

Syntax

`storm-control multicast *packets_per_second* in`

To disable storm-control for multicast traffic into the network, use the `no storm-control multicast *packets_per_second* in` command.

Parameters

packets_per_second in	Enter the packets per second of multicast traffic allowed into the network. The range is from 0 to 33554368.

Defaults

none

Command Modes

CONFIGURATION (conf)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-series and S-Series.

Usage Information

Broadcast traffic (all 0xFs) should be counted against the broadcast storm control meter, not against the multicast storm control meter. It is possible, however, that some multicast control traffic may get dropped when storm control thresholds are exceeded.

storm-control multicast (Interface)

Configure the percentage of multicast traffic allowed on an C-Series or S-Series interface (ingress only) network only.

S6000

Syntax

`storm-control multicast packets_per_second in`

To disable multicast storm control on the interface, use the `no storm-control multicast packets_per_second in` command.

Parameters

packets_per_second in	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults

none

Command Modes

INTERFACE (conf-if-*interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the C-series and S-Series.

storm-control unknown-unicast (Configuration)

Configure the percentage of unknown-unicast traffic allowed in or out of the network.

S6000

Syntax

`storm-control unknown-unicast [packets_per_second in]`

To disable storm control for unknown-unicast traffic, use the `no storm-control unknown-unicast [packets_per_second in]` command.

Parameters

packets_per_second in	Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554368.

Defaults

none

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	E-Series Only: Added the `percentage decimal value` option.
Version 6.5.1.0	Introduced on the E-Series.

Usage Information

Unknown Unicast Storm-Control is valid for Layer 2 and Layer 2/Layer 3 interfaces.

storm-control unknown-unicast (Interface)

Configure percentage of unknown-unicast traffic allowed on an interface (ingress only).

S6000

Syntax

```
storm-control unknown-unicast [percentage decimal_value in] |
[wred-profile name]] [packets_per_second in]
```

To disable unknown-unicast storm control on the interface, use the `no storm-control unknown-unicast [percentage decimal_value in] | [wred-profile name]] [packets_per_second in]` command.

Parameters

percentage decimal_value [in | out]	E-Series Only: Enter the percentage of broadcast traffic allowed in or out of the network. Optionally, you can designate a decimal value percentage, for example, 55.5%. The percentage is from 0 to 100: • 0% blocks all related traffic.

- 100% allows all traffic into the interface.

The decimal range is from 0.1 to 0.9.

wred-profile name	E-Series Only: (Optionally) Enter the keywords `wred-profile` followed by the profile name to designate a wred-profile.
***packets_per_second* in**	C-Series and S-Series Only: Enter the packets per second of broadcast traffic allowed into the network. The range is from 0 to 33554431.

Defaults none

Command Modes INTERFACE (conf-if-*interface-slot/port*)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	E-Series Only: Added the `percentage decimal value` option.
Version 6.5.1.0	Introduced on the E-Series.

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Spanning Tree Protocol (STP)

The commands in this chapter configure and monitor the IEEE 802.1d spanning tree protocol (STP) and are supported on the S6000 Dell Networking switch/routing platform.

bridge-priority

Set the bridge priority of the switch in an IEEE 802.1D spanning tree.

S6000

Syntax	`bridge-priority {`*`priority-value`*` | primary | secondary}` To return to the default value, use the `no bridge-priority` command.
Parameters	

priority-value	Enter a number as the bridge priority value. The range is from 0 to 65535. The default is **32768**.
primary	Enter the keyword `primary` to designate the bridge as the root bridge.
secondary	Enter the keyword `secondary` to designate the bridge as a secondary root bridge.

Defaults	priority-value = **32768**
Command Modes	SPANNING TREE (The prompt is “config-stp”.)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

pre-Version 6.2.1.1	Introduced on the E-Series.

bpdu-destination-mac-address

Use the Provider Bridge Group address in Spanning Tree or GVRP PDUs.

S6000

Syntax	`bpdu-destination-mac-address [stp	gvrp] provider-bridge-group`
Parameters	

xstp	Force STP, RSTP, and MSTP to use the Provider Bridge Group address as the destination MAC address in its BPDUs.
gvrp	Forces GVRP to use the Provider Bridge GVRP Address as the destination MAC address in its PDUs.

Defaults	The destination MAC address for BPDUs is the Bridge Group Address.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the S4810.
Version 8.2.1.0	Introduced on the C-Series and S-Series.

debug spanning-tree

Enable debugging of the spanning tree protocol and view information on the protocol.

S6000

Syntax

```
debug spanning-tree {stp-id [all | bpdu | config | events |
exceptions | general | root] | protocol}
```

To disable debugging, use the `no debug spanning-tree` command.

Parameters

stp-id	Enter zero (0). The switch supports one spanning tree group with a group ID of 0.
protocol	Enter the keyword for the type of STP to debug, either `mstp`, `pvst`, or `rstp`.
all	(OPTIONAL) Enter the keyword `all` to debug all spanning tree operations.
bpdu	(OPTIONAL) Enter the keyword `bpdu` to debug bridge protocol data units.
config	(OPTIONAL) Enter the keyword `config` to debug configuration information.
events	(OPTIONAL) Enter the keyword `events` to debug STP events.
general	(OPTIONAL) Enter the keyword `general` to debug general STP operations.
root	(OPTIONAL) Enter the keyword `root` to debug STP root transactions.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

When you enable `debug spanning-tree bpdu` for multiple interfaces, the software only sends information on BPDUs for the last interface specified.

Related Commands

protocol spanning-tree — enters SPANNING TREE mode on the switch.

description

Enter a description of the spanning tree.

S6000

Syntax	`description {description}` To remove the description from the spanning tree, use the `no description {description}` command.
Parameters	*description* — Enter a description to identify the spanning tree (80 characters maximum).
Defaults	none
Command Modes	SPANNING TREE (The prompt is “config-stp”.)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
pre-Version 7.7.1.0	Introduced

Related Commands	protocol spanning-tree — enters SPANNING TREE mode on the switch.

disable

Disable the spanning tree protocol globally on the switch.

S6000

Syntax	`disable` To enable Spanning Tree Protocol, use the `no disable` command.
Defaults	Enabled (that is, the spanning tree protocol is disabled.)

Command Modes	SPANNING TREE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands	protocol spanning-tree — enters SPANNING TREE mode on the switch.

forward-delay

The amount of time the interface waits in the Listening state and the Learning state before transitioning to the Forwarding state.

S6000

Syntax	`forward-delay` *`seconds`* To return to the default setting, use the `no forward-delay` command.
Parameters	

seconds	Enter the number of seconds the Dell Networking OS waits before transitioning STP to the Forwarding state. The range is from 4 to 30. The default is **15 seconds**.

Defaults	**15 seconds**
Command Modes	SPANNING TREE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

max-age — changes the wait time before STP refreshes protocol configuration information.

hello-time — changes the time interval between BPDUs.

hello-time

Set the time interval between generation of the spanning tree bridge protocol data units (BPDUs).

S6000

Syntax

`hello-time *seconds*`

To return to the default value, use the `no hello-time` command.

Parameters

seconds	Enter a number as the time interval between transmission of BPDUs. The range is from 1 to 10. The default is **2 seconds**.

Defaults

2 seconds

Command Modes

SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.

Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

forward-delay — changes the wait time before STP transitions to the Forwarding state.

max-age — changes the wait time before STP refreshes protocol configuration information.

max-age

To maintain configuration information before refreshing that information, set the time interval for the spanning tree bridge.

S6000

Syntax

`max-age seconds`

To return to the default values, use the `no max-age` command.

Parameters

seconds	Enter a number of seconds the Dell Networking OS waits before refreshing configuration information. The range is from 6 to 40. The default is **20 seconds**.

Defaults

20 seconds

Command Modes

SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Related Commands

forward-delay — changes the wait time before STP transitions to the Forwarding state.

hello-time — changes the time interval between BPDUs.

protocol spanning-tree

To enable and configure the spanning tree group, enter SPANNING TREE mode.

S6000

Syntax

`protocol spanning-tree stp-id`

To disable the Spanning Tree group, use the `no protocol spanning-tree stp-id` command.

Parameters

stp-id	Enter zero (0). Dell Networking OS supports one spanning tree group, group 0.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

STP is not enabled when you enter SPANNING TREE mode. To enable STP globally on the switch, use the `no disable` command from SPANNING TREE mode.

Example

```
Dell(conf)#protocol spanning-tree 0
Dell(config-stp)#
```

Related Commands

disable — disables spanning tree group 0. To enable spanning tree group 0, use the `no disable` command.

show config

Display the current configuration for the mode. Only non-default values display.

S6000

Syntax

```
show config
```

Command Modes

SPANNING TREE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell(config-stp)#show config
protocol spanning-tree 0
  no disable
Dell(config-stp)#
```

show spanning-tree 0

Display the spanning tree group configuration and status of interfaces in the spanning tree group.

S6000

Syntax

```
show spanning-tree 0 [active | brief | guard | interface
interface | root | summary]
```

Parameters

0	Enter `0` (zero) to display information about that specific spanning tree group.
active	(OPTIONAL) Enter the keyword `active` to display only active interfaces in spanning tree group 0.
brief	(OPTIONAL) Enter the keyword `brief` to display a synopsis of the spanning tree group configuration information.
guard	(OPTIONAL) Enter the keyword `guard` to display the type of guard enabled on an STP interface and the current port state.
interface *interface*	(OPTIONAL) Enter the keyword `interface` and the type slot/port of the interface you want displayed. Type slot/port options are the following: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information.
root	(OPTIONAL) Enter the keyword `root` to display configuration information on the spanning tree group root.
summary	(OPTIONAL) Enter the keyword `summary` to only the number of ports in the spanning tree group and their state.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.5.1.0	Added support for 4-port 40G line cards on the E-Series ExaScale.

Version 8.4.2.1	Added support for the optional `guard` keyword on the C-Series, S-Series, and E-Series TeraScale.
Version 8.3.7.0	Introduced on the S4810.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Enable spanning tree group 0 prior to using this command.

The following describes the `show spanning-tree 0` command shown in the example.

Field	Description
"Bridge Identifier..."	Lists the bridge priority and the MAC address for this STP bridge.
"Configured hello..."	Displays the settings for hello time, max age, and forward delay.
"We are..."	States whether this bridge is the root bridge for the STG.
"Current root..."	Lists the bridge priority and MAC address for the root bridge.
"Topology flag..."	States whether the topology flag and the detected flag were set.
"Number of..."	Displays the number of topology changes, the time of the last topology change, and on what interface the topology change occurred.
"Timers"	Lists the values for the following bridge timers: hold time, topology change, hello time, max age, and forward delay.
"Times"	List the number of seconds since the last: • hello time • topology change • notification • aging
"Port 1..."	Displays the Interface type slot/port information and the status of the interface (Disabled or Enabled).
"Port path..."	Displays the path cost, priority, and identifier for the interface.
"Designated root..."	Displays the priority and MAC address of the root bridge of the STG that the interface belongs.
"Designated port..."	Displays the designated port ID.

Example

```
Dell#show spann 0

Executing IEEE compatible Spanning Tree Protocol
 Bridge Identifier has priority 32768, Address 0001.e800.0a56
 Configured hello time 2, max age 20, forward delay 15
 We are the root of the spanning tree
 Current root has priority 32768 address 0001.e800.0a56
 Topology change flag set, detected flag set
 Number of topology changes 1 last change occurred 0:00:05 ago
   from GigabitEthernet 1/3
 Timers:hold 1, topology change 35
        hello 2, max age 20, forward_delay 15
 Times:hello 1, topology change 1, notification 0, aging 2

Port 26 (GigabitEthernet 1/1) is Forwarding
 Port path cost 4, Port priority 8, Port Identifier 8.26
 Designated root has priority 32768, address 0001.e800.0a56
 Designated bridge has priority 32768, address 0001.e800.0a56
 Designated port id is 8.26, designated path cost 0
 Timers: message age 0, forward_delay 0, hold 0
 Number of transitions to forwarding state 1
 BPDU: sent:18, received 0
 The port is not in the portfast mode

Port 27 (GigabitEthernet 1/2) is Forwarding
 Port path cost 4, Port priority 8, Port Identifier 8.27
 Designated root has priority 32768, address 0001.e800.0a56
 Designated bridge has priority 32768, address 0001.e800.0a56
 Designated port id is 8.27, designated path cost 0
 Timers: message age 0, forward_delay 0, hold 0
 Number of transitions to forwarding state 1
 BPDU: sent:18, received 0
 The port is not in the portfast mode

Port 28 (GigabitEthernet 1/3) is Forwarding
 Port path cost 4, Port priority 8, Port Identifier 8.28
 Designated root has priority 32768, address 0001.e800.0a56
 Designated bridge has priority 32768, address 0001.e800.0a56
 Designated port id is 8.28, designated path cost 0
 Timers: message age 0, forward_delay 0, hold 0
 Number of transitions to forwarding state 1
 BPDU: sent:31, received 0
 The port is not in the portfast mode

Dell#
```

Example (Brief)

```
Dell#show span 0 brief
  Executing IEEE compatible Spanning Tree Protocol
    Root ID Priority 32768
      Address 0001.e800.0a56
    Root Bridge hello time 2, max age 20, forward delay 15
    Bridge ID Priority 32768,
      Address 0001.e800.0a56
    Configured hello time 2, max age 20, forward delay 15
Interface                        Designated
Name   PortID Prio Cost Sts Cost Bridge ID            PortID
-------------- ------ ---- ---- --- ----- ------------------
Gi 1/1 8.26   8   4     FWD 0    32768 0001.e800.0a56 8.26
Gi 1/2 8.27   8   4     FWD 0    32768 0001.e800.0a56 8.27
Gi 1/3 8.28   8   4     FWD 0    32768 0001.e800.0a56 8.28
Dell#
```

Usage Information

The following describes the `show spanning-tree 0 guard` command shown in the example.

Field	Description
Interface Name	STP interface.
Instance	STP 0 instance.
Sts	Port state: root-inconsistent (INCON Root), forwarding (FWD), listening (LIS), blocking (BLK), or shut down (EDS Shut).
Guard Type	Type of STP guard configured (Root, Loop, or BPDU guard).

Example (Guard)

```
Dell#show spanning-tree 0 guard
Interface
Name   Instance Sts          Guard type
--------- -------- --------- ----------
Gi 0/1 0        INCON(Root)  Rootguard
Gi 0/2 0        LIS          Loopguard
Gi 0/3 0        EDS (Shut)   Bpduguard
```

spanning-tree

Assigns a Layer 2 interface to STP instance 0 and configures a port cost or port priority, or enables loop guard, root guard, or the Portfast feature on the interface.

S6000

Syntax

`spanning-tree` *stp-id* `{cost` *cost* `| { | } | portfast [bpduguard [shutdown-on-violation]] | priority` *priority*`}`

To disable Spanning Tree group on an interface, use the `no spanning-tree` *stp-id* `{cost` *cost* `| { | } | portfast [bpduguard [shutdown-on-violation]] | priority` *priority*`}` command.

Parameters

stp-id	Enter the STP instance ID. The range is 0.
cost *cost*	Enter the keyword `cost` then a number as the cost. The range is from 1 to 65535. The defaults are: • 100 Mb/s Ethernet interface = **19**. • 1-Gigabit Ethernet interface = **4**. • 10-Gigabit Ethernet interface = **2**. • Port Channel interface with 100 Mb/s Ethernet = **18**. • Port Channel interface with 1 Gigabit Ethernet = **3**. • Port Channel interface with 10 Gigabit Ethernet = **1**.

portfast [bpduguard [shutdown-on-viol ation]]	Enter the keyword `portfast` to enable Portfast to move the interface into Forwarding mode immediately after the root fails. Enter the optional keyword `bpduguard` to disable the port when it receives a BPDU. Enter the optional keyword `shutdown-on-violation` to hardware disable an interface when a BPDU is received and the port is disabled.
priority *priority*	Enter keyword `priority` then a number as the priority. The range is from zero (0) to 15. The default is **8**.

Defaults

cost = depends on the interface type; priority = **8**

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.10.1	Introduced the `loopguard` and `rootguard` options on the S4810.
Version 8.4.2.1	Introduced the `loopguard` and `rootguard` options on the E-Series TeraScale, C-Series, and S-Series.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced the `shutdown-on-violation` option.
Version 7.7.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 6.2.1.1	Introduced on the E-Series.

Usage Information

If you enable `portfast bpduguard` on an interface and the interface receives a BPDU, the software disables the interface and sends a message stating that fact. The port is in ERR_DISABLE mode, yet appears in the `show interface` commands as enabled. If you do not enable `shutdown-on-violation`, BPDUs are still sent to the RPM CPU.

STP loop guard and root guard are supported on a port or port-channel enabled in any Spanning Tree mode: Spanning Tree Protocol (STP), Rapid Spanning Tree

Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), and Per-VLAN Spanning Tree Plus (PVST+).

Root guard is supported on any STP-enabled port or port-channel except when used as a stacking port. When enabled on a port, root guard applies to all VLANs configured on the port.

STP root guard and loop guard cannot be enabled at the same time on a port. For example, if you configure loop guard on a port on which root guard is already configured, the following error message is displayed: `% Error: RootGuard is configured. Cannot configure LoopGuard`.

Do not enable Portfast BPDU guard and loop guard at the same time on a port. Enabling both features may result in a port that remains in a blocking state and prevents traffic from flowing through it. For example, when Portfast BPDU guard and loop guard are both configured:

- If a BPDU is received from a remote device, BPDU guard places the port in an Err-Disabled Blocking state and no traffic is forwarded on the port.
- If no BPDU is received from a remote device, loop guard places the port in a Loop-Inconsistent Blocking state and no traffic is forwarded on the port.

To display the type of STP guard (Portfast BPDU, root, or loop guard) enabled on a port, enter the `show spanning-tree 0` command.

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System Time and Date

The commands in this chapter configure time values on the system, either using the Dell Networking operating software, or the hardware, or using the network time protocol (NTP). With NTP, the switch can act only as a client to an NTP clock host.

For more information, refer to the “Network Time Protocol” section of the *Management* chapter in the *Dell Networking OS Configuration Guide*.

The commands in this chapter are generally supported on the S6000 with some exceptions, as notes in the Command History fields.

calendar set

Set the time and date for the switch hardware clock.

S6000

Syntax

```
calendar set time month day year
```

Parameters

time	Enter the time in hours:minutes:seconds. For the hour variable, use the 24-hour format; for example, 17:15:00 is 5:15 pm.
month	Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.
day	Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.
year	Enter a four-digit number as the year. The range is from 1993 to 2035.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

You can change the order of the month and day parameters to enter the time and date as time day month year.

In the switch, the hardware clock is separate from the software and is called the calendar. This hardware clock runs continuously. After the hardware clock (the calendar) is set, the Dell Networking OS automatically updates the software clock after system bootup. You cannot delete the hardware clock (calendar).

To manually update the software with the hardware clock, use the `clock read-calendar` command.

Example

```
Dell#calendar set 08:55:00 june 18 2006
Dell#
```

Related Commands

clock read-calendar — sets the software clock based on the hardware clock.

show clock — displays the clock settings.

clock read-calendar

Set the software clock on the switch from the information set in hardware clock (calendar).

S6000

Syntax	`clock read-calendar`
Defaults	Not configured.
Command Modes	EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

In the switch, the hardware clock is separate from the software and is called the calendar. This hardware clock runs continuously. After the hardware clock (the calendar) is set, the Dell Networking OS automatically updates the software clock after system bootup.

You cannot delete this command (there is not a `no` version of this command).

clock summer-time date

Set a date (and time zone) on which to convert the switch to daylight saving time on a one-time basis.

S6000

Syntax

`clock summer-time time-zone date start-month start-day start-year start-time end-month end-day end-year end-time [offset]`

To delete a daylight saving time zone configuration, use the `no clock summer-time` command.

Parameters

time-zone	Enter the three-letter name for the time zone. This name is displayed in the show clock output.
start-month	Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.
start-day	Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.
start-year	Enter a four-digit number as the year. The range is from 1993 to 2035.
start-time	Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.

end-day	Enter the number of the day. The range is from 1 to 31. You can enter the name of a month to change the order of the display to time day month year.
end-month	Enter the name of one of the 12 months in English. You can enter the name of a day to change the order of the display to time day month year.
end-time	Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.
end-year	Enter a four-digit number as the year. The range is from 1993 to 2035.
offset	(OPTIONAL) Enter the number of minutes to add during the summer-time period. The range is from 1 to1440. The default is **60 minutes**.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

calendar set — sets the hardware clock.

clock summer-time recurring — sets a date (and time zone) on which to convert the switch to daylight saving time each year.

show clock — displays the current clock settings.

clock summer-time recurring

Set the software clock to convert to daylight saving time on a specific day each year.

S6000

Syntax

`clock summer-time` *`time-zone`* `recurring [`*`start-week start-day start-month start-time end-week end-day end-month end-time`* `[`*`offset`*`]]`

To delete a daylight saving time zone configuration, use the `no clock summer-time` command.

Parameters

time-zone	Enter the three-letter name for the time zone. This name is displayed in the show clock output. You can enter up to eight characters.
start-week	(OPTIONAL) Enter one of the following as the week that daylight saving begins and then enter values for start-day through end-time: • `week-number`: Enter a number from 1 to 4 as the number of the week in the month to start daylight saving time. • `first`: Enter this keyword to start daylight saving time in the first week of the month. • `last`: Enter this keyword to start daylight saving time in the last week of the month.
start-day	Enter the name of the day that you want daylight saving time to begin. Use English three letter abbreviations; for example, Sun, Sat, Mon, and so on. The range is from Sun to Sat.
start-month	Enter the name of one of the 12 months in English.
start-time	Enter the time in hours:minutes. For the hour variable, use the 24-hour format; example, 17:15 is 5:15 pm.
end-week	Enter the one of the following as the week that daylight saving ends: • `week-number`: enter a number from 1 to 4 as the number of the week to end daylight saving time. • `first`: enter the keyword `first` to end daylight saving time in the first week of the month. • `last`: enter the keyword `last` to end daylight saving time in the last week of the month.
end-day	Enter the weekday name that you want daylight saving time to end. Enter the weekdays using the three letter abbreviations; for example Sun, Sat, Mon, and so on. The range is from Sun to Sat.

end-month	Enter the name of one of the 12 months in English.
end-time	Enter the time in hours:minutes:seconds. For the hour variable, use the 24-hour format; example, 17:15:00 is 5:15 pm.
offset	(OPTIONAL) Enter the number of minutes to add during the summer-time period. The range is from 1 to 1440. The default is **60 minutes**.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
Version 7.4.1.0	Updated the `start-day` and `end-day` options to allow for using the three-letter abbreviation of the weekday name.
pre-Version 6.1.1.0	Introduced on the E-Series.

Related Commands

calendar set — sets the hardware clock.

clock summer-time date — sets a date (and time zone) on which to convert the switch to daylight saving time on a one-time basis.

show clock — displays the current clock settings.

clock timezone

Configure a timezone for the switch.

S6000

Syntax	`clock timezone timezone-name offset` To delete a timezone configuration, use the `no clock timezone` command.

Parameters

timezone-name	Enter the name of the timezone. You cannot use spaces.
offset	Enter one of the following: • a number from 1 to 23 as the number of hours in addition to universal time coordinated (UTC) for the timezone. • a minus sign (-) then a number from 1 to 23 as the number of hours.

Defaults

Not configured.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

Coordinated universal time (UTC) is the time standard based on the International Atomic Time standard, commonly known as Greenwich Mean time. When determining system time, include the differentiator between UTC and your local timezone. For example, San Jose, CA is the Pacific Timezone with a UTC offset of -8.

debug ntp

Display network time protocol (NTP) transactions and protocol messages for troubleshooting.

S6000

Syntax

```
debug ntp {adjust | all | authentication | events | loopfilter
| packets | select | sync}
```

To disable debugging of NTP transactions, use the `no debug ntp {adjust | all | authentication | events | loopfilter | packets | select | sync}` command.

Parameters

adjust	Enter the keyword `adjust` to display information on NTP clock adjustments.
all	Enter the keyword `all` to display information on all NTP transactions.
authentication	Enter the keyword `authentication` to display information on NTP authentication transactions.
events	Enter the keyword `events` to display information on NTP events.
loopfilter	Enter the keyword `loopfilter` to display information on NTP local clock frequency.
packets	Enter the keyword `packets` to display information on NTP packets.
select	Enter the keyword `select` to display information on the NTP clock selection.
sync	Enter the keyword `sync` to display information on the NTP clock synchronization.

Command Modes

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

ntp authenticate

Enable authentication of NTP traffic between the switch and the NTP time serving hosts.

S6000

Syntax

`ntp authenticate`

To disable NTP authentication, use the `no ntp authentication` command.

Defaults

Not enabled.

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

You also must configure an authentication key for NTP traffic using the `ntp authentication-key` command.

ntp broadcast client

Set up the interface to receive NTP broadcasts from an NTP server.

S6000

Syntax	`ntp broadcast client` To disable broadcast, use the `no ntp broadcast client` command.
Defaults	Disabled.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

ntp disable

Prevent an interface from receiving NTP packets.

S6000

Syntax	`ntp disable` To re-enable NTP on an interface, use the `no ntp disable` command.
Defaults	Disabled (that is, if you configure an NTP host, all interfaces receive NTP packets)
Command Modes	INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

ntp multicast client

To receive NTP information from the network via multicast, configure the switch.

S6000

Syntax

`ntp multicast client [`*`multicast-address`*`]`

To disable multicast reception, use the `no ntp multicast client [`*`multicast-address`*`]` command.

Parameters

multicast-address	(OPTIONAL) Enter a multicast address. Enter either an IPv4 address in dotted decimal format or an IPv6 address in X:X:X:X::X format. If you do not enter a multicast address, the address: • 224.0.1.1 is configured if the interface address is IPv4 • ff05::101 is configured if the interface address is IPv6

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.4.1.0	Added support for IPv6 multicast addresses.
Version 8.3.7.0	Introduced on the S4810.
pre-Version 6.1.1.0	Introduced on the E-Series.

show calendar

Display the current date and time based on the switch hardware clock.

S6000

Syntax `show calendar`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show calendar
16:33:30 UTC Tue Jun 26 2001
Dell#
```

Related Commands	show clock — displays the time and date from the switch software clock.

show clock

Display the current clock settings.

S6000

Syntax `show clock [detail]`

Parameters

detail	(OPTIONAL) Enter the keyword `detail` to view the source information of the clock.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Example

```
Dell#show clock
11:05:56.949 UTC Thu Oct 25 2001
Dell#
```

Example (Detail)

```
Dell#show clock detail
12:18:10.691 UTC Wed Jan 7 2009
Time source is RTC hardware
Summer time starts 02:00:00 UTC Sun Mar 8 2009
Summer time ends 02:00:00 ABC Sun Nov 1 2009
Dell#
```

Related Commands	clock summer-time recurring — displays the time and date from the switch hardware clock. show calendar — displays the time and date from the switch hardware clock.

show ntp associations

Display the NTP master and peers.

S6000

Syntax `show ntp associations`

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ntp associations` command shown in the Example below.

Field	Description
(none)	One or more of the following symbols could be displayed: • * means synchronized to this peer. • # means almost synchronized to this peer. • + means the peer was selected for possible synchronization. • - means the peer is a candidate for selection.

Field	Description
	- ~ means the peer is statically configured.
remote	Displays the remote IP address of the NTP peer.
ref clock	Displays the IP address of the remote peer’s reference clock.
st	Displays the peer’s stratum, that is, the number of hops away from the external time source. A 16 in this column means the NTP peer cannot reach the time source.
when	Displays the last time the switch received an NTP packet.
poll	Displays the polling interval (in seconds).
reach	Displays the reachability to the peer (in octal bitstream).
delay	Displays the time interval or delay for a packet to complete a round-trip to the NTP time source (in milliseconds).
offset	Displays the relative time of the NTP peer’s clock to the switch clock (in milliseconds).
disp	Displays the dispersion.

Example

```
Dell#show ntp associations
remote      ref clock  st when poll reach delay  offset disp
=============================================================
 10.10.120.5 0.0.0.0     16 - 256        0 0.00 0.000 16000.0
*172.16.1.33 127.127.1.0 11 6 16         377   -0.08 -1499.9
104.16
 172.31.1.33 0.0.0.0     16 - 256        0 0.00 0.000 16000.0
 192.200.0.2 0.0.0.0     16 - 256        0 0.00 0.000 16000.0
* master (synced), # master (unsynced), + selected, - candidate
Dell#
```

Related Commands

show ntp status — displays the current NTP status.

show ntp status

Display the current NTP status.

S6000

Syntax

```
show ntp status
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.1.1.0	Introduced on the E-Series.

Usage Information

The following describes the `show ntp status` command shown in the Example below.

Field	Description
"Clock is..."	States whether or not the switch clock is synchronized, which NTP stratum the system is assigned and the IP address of the NTP peer.
"frequency is..."	Displays the frequency (in ppm), stability (in ppm) and precision (in Hertz) of the clock in this system.
"reference time is..."	Displays the reference time stamp.
"clock offset is..."	Displays the system offset to the synchronized peer and the time delay on the path to the NTP root clock.
"root dispersion is..."	Displays the root and path dispersion.
"peer mode is..."	State what NTP mode the switch is. This should be Client mode.

Example

```
Dell#sh ntp status
Clock is synchronized, stratum 2, reference is 100.10.10.10
frequency is -32.000 ppm, stability is 15.156 ppm, precision
is 4294967290
reference time is BC242FD5.C7C5C000 (10:15:49.780 UTC Mon Jan
10 2000)
clock offset is clock offset msec, root delay is 0.01656 sec
root dispersion is 0.39694 sec, peer dispersion is peer
dispersion msec
peer mode is client
Dell#
```

Related Commands

show ntp associations — displays information on the NTP master and peer configurations.

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Tunneling

Tunneling is supported on the S6000 platform.

tunnel-mode

Enable a tunnel interface.

S6000

Syntax	`tunnel mode {ipip | ipv6 | ipv6ip}[decapsulate-any]` To disable an active tunnel interface, use the **no tunnel** `mode` command.
Parameters	

ipip	Enable tunnel in RFC 2003 mode and encapsulate IPv4 and/or IPv6 datagrams inside an IPv4 tunnel.
ipv6	Enable tunnel in RFC 2473 mode and encapsulate IPv4 and/or IPv6 datagrams inside an IPv6 tunnel.
ipv6ip	Enable tunnel in RFC 4213 mode and encapsulate IPv6 datagrams inside an IPv4 tunnel.
decapsulate-any	(Optional) Enable tunnel in multipoint receive-only mode.

Defaults	None
Command Modes	INTERFACE TUNNEL
Command History	

Version 9.4(0.0)	Added the decapsulate-any command.
Version 9.2(0.0)	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

To enable a tunnel interface, use this command. You must define a tunnel mode for the tunnel to function. If you previously defined the tunnel destination or source address, the tunnel mode must be compatible.

Including the decapsulate-any option causes the command to fail if any of the following tunnel transmit options are configured: tunnel destination, tunnel dscp, tunnel flow-label, tunnel hop-limit, or tunnel keepalive. Conversely, if you configure any tunnel allow-remote entries, the `tunnel—mode` command fails unless the decapsulate-any option is included

Configuration of IPv6 commands over decapsulate-any tunnel causes an error.

tunnel source

Set a source address for the tunnel.

S6000

Syntax

```
tunnel source {ip-address | ipv6-address | interface-type-number | anylocal}
```

To delete the current tunnel source address, use the `no tunnel source` command.

Parameters

ip-address	Enter the source IPv4 address in A.B.C.D format.
ipv6–address	Enter the source IPv6 address in X:X:X:X::X format.
interface-type-number	• For a 100/1000 Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a 1–Gigabit Ethernet interface, enter the keyword `GigabitEthernet` then the slot/port information. • For a port channel interface, enter the keywords `port-channel` then a number from 1 to 128. • For a 10–Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then a number from 1 to 4094.
anylocal	Enter the `anylocal` command to allow the multipoint receive-only tunnel to decapsulate tunnel packets destined to any local ip address.

Defaults

none

Command Modes

INTERFACE TUNNEL (conf-if-tu)

Command History

Version 9.4(0.0)	Added the tunnel source anylocal command.
Version 9.2(0.0)	Introduced on the MXL 10/40GbE Switch IO Module.

Usage Information

Added an optional keyword **"anylocal"** to the tunnel source command. The anylocal argument can be used in place of the ip address or interface, but only with the multipoint receive-only mode tunnels. The tunnel source `anylocal` command allows the multipoint receive-only tunnel to decapsulate tunnel packets addressed to any IPv4 or IPv6 (depending on the tunnel mode) address configured on the switch that is operationally **Up**.

tunnel keepalive

Configure the tunnel keepalive target, interval and attempts.

S6000

Syntax

```
tunnel keepalive {ip-address | ipv6-address}[interval
{seconds}] [attempts {count | unlimited}]
```

To disable the tunnel keepalive probes use the **no tunnel keepalive** command.

Parameters

ip-address ipv6 address	Enter the `IPv4 or IPv6 address` of the peer to which the keepalive probes will be sent.
interval seconds	Enter the keyword `interval` then the interval time, in seconds, after which the restart process to keepalive probe packets. The range is from 5 to 255. The default is 5.
count	(OPTIONAL) Enter the keyword **count** to count packets processed by the filter. The range is from 3 to 10. The default is 3.
unlimited	Enter the keyword **unlimited** to specify the unlimited number of keepalive probe packets.

Defaults

Tunnel keepalive is disabled.

Command Modes

INTERFACE TUNNEL

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information

Enabling tunnel keepalive causes ICMP echo packets to be sent to the keepalive target. The ICMP echo will be sourced from the tunnel interface logical IPv4 or IPv6 address and will be tunnel encapsulated. The response will be accepted whether it returns tunnel encapsulated or not.

When configuring tunnel keepalive at both end points of a tunnel interface it is recommended to set the tunnel keepalive target to the logical IPv4 or IPv6 address of the far end tunnel peer, rather than to the tunnel destination. This reduces the chance of both ends of the tunnel staying in keepalive down state. If both ends get into a keepalive down state that does not clear in a few seconds, then performing shutdown - no shutdown sequence on one end should bring both ends back to up.

tunnel allow-remote

Configure an IPv4 or IPv6 address or prefix whose tunneled packets are accepted for decapsulation. If you do not configure allow-remote entries, tunneled packets from any remote peer address is accepted.

S6000

Syntax

tunnel allow-remote `{ip-address | ipv6-address} [mask]`

To delete a configured allow-remote entry use the **no** `tunnel allow-remote` command. Any specified address/mask values must match an existing entry for the delete to succeed. If the address and mask are not specified, this command deletes all allow-remote entries.

Parameters

ip-address	Enter the source IPv4 address in A.B.C.D format.
ipv6–address	Enter the source IPv6 address in X:X:X:X::X format.
mask	(OPTIONAL) Enter a network mask in /prefix format (/x) or A.B.C.D to match a range of remote addresses. The default mask is /32 for IPv4 addresses and /128 for IPv6 addresses, which match only the specified address.

Defaults

If you do not configure tunnel allow remote , all traffic which is destined to tunnel source address is decapsulated.

Command Modes

INTERFACE TUNNEL

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information

You can configure up to eight allow-remote entries on any multipoint receive-only tunnel.

This command fails if the address family entered does not match the outer header address family of the tunnel mode, tunnel source, or any other tunnel allow-remote.

If you configure any allow-remote , the tunnel source or tunnel mode commands fail if the outer header address family does not match that of the configured allow-remote.

tunnel dscp

Configure the method to set the DSCP in the outer tunnel header.

S6000

Syntax

```
tunnel dscp {mapped | <value>}
```

To use the default tunnel mapping behavior, use the `no tunnel dscp value` command.

Parameters

mapped	Enter the keyword `mapped` to map the original packet DSCP (IPv4)/Traffic Class (IPv6) to the tunnel header DSCP (IPv4)/ Traffic Class (IPv6) depending on the mode of tunnel.
value	Enter a value to set the DSCP value in the tunnel header. The range is from 0 to 63. The default value of **0** denotes mapping of original packet DSCP (IPv4)/Traffic Class (IPv6) to the tunnel header DSCP (IPv4)/Traffic Class (IPv6) depending on the mode of tunnel.

Defaults

0 (Mapped)

Command Modes

INTERFACE TUNNEL (conf-if-tu)

Command History

Version 9.3(0.0)	Introduced on the S6000, S4810, S4820T, Z9000.

Usage Information

This command configures the method used to set the high 6 bits (the differentiated services codepoint) of the IPv4 TOS or the IPv6 traffic class in the outer IP header.

A value of 0 copies original packet DSCP (IPv4)/Traffic Class (IPv6) to the tunnel header DSCP (IPv4)/Traffic Class (IPv6) depending on the mode of tunnel.

tunnel flow-label

Configure the method to set the IPv6 flow label value in the outer tunnel header.

S6000

Syntax

```
tunnel flow-label value
```

To return to the default value of 0, use the `no tunnel flow-label value` command.

Parameters

value	Enter a value to set the IPv6 flow label value in the tunnel header. The range is from 0 to 1048575. The default value is **0**.

Defaults	**0** (Mapped original packet flow-label value to tunnel header flow-label value)
Command Modes	INTERFACE TUNNEL (conf-if-tu)
Command History	Version 9.3(0.0) Introduced on the S6000, S4810, S4820T, Z9000.
Usage Information	This command is only valid for tunnel interfaces with an IPv6 outer header.

tunnel hop-limit

Configure the method to set the IPv4 time-to-live or the IPv6 hop limit value in the outer tunnel header.

S6000

Syntax

`tunnel hop-limit value`

To restore the default tunnel hop-limit, use the `no tunnel hop-limit` command.

Parameters

value	Enter the hop limit (ipv6) or time-to-live (ipv4) value to include in the tunnel header. The range is from 0 to 255. The default is **64**.

Defaults	**64** (Time-to-live for IPv4 outer tunnel header or hop limit for IPv6 outer tunnel header)
Command Modes	INTERFACE TUNNEL (conf-if-tu)
Command History	Version 9.3(0.0) Introduced on the S6000, S4810, S4820T, Z9000.
Usage Information	A value of 0 copies the inner packet hop limit (ipv6) or time-to-live (ipv4) in the encapsulated packet to the tunnel header hop limit (ipv6) or time-to-live (ipv4) value.

tunnel destination

Set a destination endpoint for the tunnel.

S6000

Syntax	`tunnel destination {ip-address | ipv6-address}` To delete a tunnel destination address, use the `no tunnel destination {ip-address | ipv6-address}` command.
Parameters	*ip-address* — Enter the destination IPv4 address for the tunnel. *ipv6–address* — Enter the destination IPv6 address for the tunnel.
Defaults	none
Command Modes	INTERFACE TUNNEL (conf-if-tu)
Command History	Version 9.3(0.0) — Introduced on the S4810, S4820T, S6000 and Z9000.
Usage Information	The tunnel interface is inoperable without a valid tunnel destination address for the configured Tunnel mode. To establish a logical tunnel to the particular destination address, use the destination address of the outer tunnel header. If you configure a tunnel interface or source address, the tunnel destination must be compatible.

ip unnumbered

Configure a tunnel interface to operate without a unique IPv4 address and select the interface from which the tunnel borrows its address.

S6000

Syntax	**ip unnumbered** `{interface-type interface-number}` To set the tunnel back to default logical address use the **no ip unnumbered** command. If the tunnel was previously operational, the tunnel interface is operationally down unless you also configure the tunnel IPv6 address.
Parameters	*interface-type interface-number* — Enter the interface type, followed by a slot number.

Defaults	None
Command Modes	INTERFACE TUNNEL
Command History	Version 9.4(0.0) — Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information

The ip unnumbered command fails in two conditions:

- If the logical ip address is configured.
- If Tunnel mode is ipv6ip (where ip address over tunnel interface is not possible).

To ping the unnumbered tunnels, the logical address route information must be present at both the ends.

NOTE: The `ip unnumbered` command can specify an interface name that does not exist or does not have a configured IPv6 address. The tunnel interface is not changed to operationally up until logical ip address is identified from the one of the address family.

ipv6 unnumbered

Configure a tunnel interface to operate without a unique IPv6 address and select the interface from which the tunnel borrows its address.

S6000

Syntax

ipv6 unnumbered `{interface-type interface-number}`

To set the tunnel back to default logical address use the **no ipv6 unnumbered** command. If the tunnel was previously operational, the tunnel interface is operationally down unless you also configure the tunnel IPv4 address.

Parameters

interface-type interface-number	Enter the interface type, followed by the type, slot and port information.

Defaults	None.
Command Modes	INTERFACE TUNNEL
Command History	Version 9.4(0.0) — Introduced on the S4810, S4820T, S6000 and Z9000.

Usage Information

The ip unnumbered command fails in two conditions:

- If the logical ip address is configured.

- If Tunnel mode is ipv6ip (where ip address over tunnel interface is not possible).

To ping the unnumbered tunnels, the logical address route information must be present at both the ends.

NOTE: The `ipv6 unnumbered` command can specify an interface name that does not exist or does not have a configured IPv6 address. The tunnel interface is not changed to operationally up until the logical ip address is identified from the one of the address family.

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VLAN Stacking

With the virtual local area network (VLAN)-stacking feature (also called stackable VLANs and QinQ), you can "stack" VLANs into one tunnel and switch them through the network transparently.

The Dell Networking operating software supports this feature on the S6000 platform.

For more information about basic VLAN commands, refer to the *Virtual LAN (VLAN) Commands* section in the Layer 2 chapter.

Important Points to Remember

- If you do not enable the spanning tree protocol (STP) across the stackable VLAN network, STP bridge protocol data units (BPDUs) from the customer's networks are tunneled across the stackable VLAN network.
- If you do enable STP across the stackable VLAN network, STP BPDUs from the customer's networks are consumed and not tunneled across the stackable VLAN network unless you enable protocol tunneling.

  NOTE: For more information about protocol tunneling on the E-Series, refer to Service Provider Bridging.
- Layer 3 protocols are not supported on a stackable VLAN network.
- Assigning an IP address to a stackable VLAN is supported when all the members are only stackable VLAN trunk ports. IP addresses on a stackable VLAN-enabled VLAN are not supported if the VLAN contains stackable VLAN access ports. This facility is provided for the simple network management protocol (SNMP) management over a stackable VLAN-enabled VLAN containing only stackable VLAN trunk interfaces. Layer 3 routing protocols on such a VLAN are not supported.
- Dell Networking recommends that you do not use the same MAC address, on different customer VLANs, on the same stackable VLAN.
- Interfaces configured using stackable VLAN access or stackable VLAN trunk commands do not switch traffic for the default VLAN. These interfaces are switch traffic only when they are added to a non-default VLAN.
- Starting with Dell Networking OS version 7.8.1 for C-Series and S-Series (Dell Networking OS version 7.7.1 for E-Series, 8.2.1.0 for E-Series ExaScale), a vlan-stack trunk port is also allowed to be configured as a tagged port and as an untagged port for single-tagged VLANs. When the vlan-stack trunk port is also a member of an untagged vlan, the port must be in Hybrid mode. Refer to portmode hybrid.

dei enable

Make packets eligible for dropping based on their DEI value.

S6000

Syntax	`dei enable`
Defaults	Packets are colored green; no packets are dropped.
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the C-Series and S-Series.

dei honor

Honor the incoming DEI value by mapping it to an Dell Networking OS drop precedence. Enter the command once for 0 and once for 1.

S6000

Syntax

```
dei honor {0 | 1} {green | red | yellow}
```

Parameters

0 | 1	Enter the bit value you want to map to a color.
green | red | yellow	Choose a color: • `Green`: High priority packets that are the least preferred to be dropped. • `Yellow`: Lower priority packets that are treated as best-effort. • `Red`: Lowest priority packets that are always dropped (regardless of congestion status).

Defaults: Disabled; Packets with an unmapped DEI value are colored green.

Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the C-Series and S-Series.

Usage Information	You must first enable DEI for this configuration to take effect.
Related Commands	dei enable — Make packets eligible for dropping based on their DEI value.

dei mark

Set the DEI value on egress according to the color currently assigned to the packet.

S6000

Syntax

```
dei mark {green | yellow} {0 | 1}
```

Parameters

0 | 1	Enter the bit value you want to map to a color.
green | red | yellow	Choose a color: • `Green`: High priority packets that are the least preferred to be dropped. • `Yellow`: Lower priority packets that are treated as best-effort.

Defaults	All the packets on egress are marked with DEI 0.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Instroduces on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the C-Series and S-Series.

Usage Information

You must first enable DEI for this configuration to take effect.

Related Commands

dei enable – Make packets eligible for dropping based on their DEI value.

member

Assign a stackable VLAN access or trunk port to a VLAN. The VLAN must contain the `vlan-stack compatible` command in its configuration.

S6000

Syntax

`member` *`interface`*

To remove an interface from a Stackable VLAN, use the `no member` *`interface`* command.

Parameters

interface	Enter the following keywords and slot/port or number information: • For a Port Channel interface, enter the keywords `port-channel` then a number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `GigabitEthernet` followed by the slot/ port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabyte Ethernet interface, enter the keyword `fortyGigE` then the slot/ port information.

Defaults

Not configured.

Command Modes

CONF-IF-VLAN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.2.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information	You must enable the stackable VLAN (using the `vlan-stack compatible` command) on the VLAN prior to adding a member to the VLAN.
Related Commands	vlan-stack compatible — enables stackable VLAN on a VLAN.

stack-unit stack-group

Configure a stacking group specified by an ID.

S6000

Syntax `[no] stack-unit unit-id stack-group stack-group-id`

Parameters

unit-id	Enter the stack unit ID.
stack-group-id	Enter the stack group ID. The range is from 0 to 16.
[no]	Use `no stack-unit unit-id stack-group stack-id` to remove the current stack group configuration.

Command Modes CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.10.2	Introduced on the S4810.

Usage Information	**WARNING: The following message displays to confirm the command: `All non-default configurations on the related member ports ports (<ports listed here>) will be removed. Do you want to continue (y/n)?` If you enter "y", all non-default configurations on any member ports of the current stack group is removed when the unit is rebooted.**

vlan-stack access

Specify a Layer 2 port or port channel as an access port to the stackable VLAN network.

S6000

Syntax

```
vlan-stack access
```

To remove access port designation, use the `no vlan-stack access` command.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

Prior to enabling this command, to place the interface in Layer 2 mode, enter the `switchport` command.

To remove the access port designation, remove the port (using the `no member interface` command) from all stackable VLAN enabled VLANs.

vlan-stack compatible

Enable the stackable VLAN feature on a VLAN.

S6000

Syntax	`vlan-stack compatible` To disable the Stackable VLAN feature on a VLAN, use the `no vlan-stack compatible` command.
Defaults	Not configured.
Command Modes	CONF-IF-VLAN
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

Prior to disabling the stackable VLAN feature, remove the members.

To view the stackable VLANs, use the `show vlan` command in EXEC Privilege mode. Stackable VLANs contain members, designated by the M in the Q column of the command output.

Example

```
Dell#show vlan

Codes: * - Default VLAN, G - GVRP VLANs

   NUM  Status    Q Ports
*  1    Inactive
   2    Active    M Gi 13/13
                  M Gi 13/0-2
   3    Active    M Po1(Gi 13/14-15)
                  M Gi 13/18
                  M Gi 13/3
   4    Active    M Po1(Gi 13/14-15)
                  M Gi 13/18
```

```
                   M Gi 13/4
   5    Active     M Po1(Gi 13/14-15)
                   M Gi 13/18
                   M Gi 13/5
Dell#
```

vlan-stack dot1p-mapping

Map C-Tag dot1p values to a S-Tag dot1p value. You can separate the C-Tag values by commas and dashed ranges are permitted. Dynamic mode CoS overrides any Layer 2 QoS configuration in case of conflicts.

S6000

Syntax `vlan-stack dot1p-mapping c-tag-dot1p *values* sp-tag-dot1p *value*`

Parameters

c-tag-dot1p *value*	Enter the keyword `c-tag-dot1p` then the customer dot1p value that is mapped to a service provider do1p value. The range is from 0 to 7.
sp-tag-dot1p *value*	Enter the keyword `sp-tag-dot1p` then the service provider dot1p value. The range is from 0 to 7.

Defaults none

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 8.3.1.0	Introduced on the C-Series and S-Series.

vlan-stack protocol-type

Define the stackable VLAN tag protocol identifier (TPID) for the outer VLAN tag (also called the VMAN tag). If you do not configure this command, Dell Networking OS assigns the value 0x9100.

S6000

Syntax

```
vlan-stack protocol-type number
```

Parameters

number	Enter the hexadecimal number as the stackable VLAN tag. You may specify both bytes of the 2-byte S-Tag TPID. The range is from 0 to FFFF. The default is **9100**.

Defaults

0x9100

Command Modes

CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the E-Series ExaScale. C-Series and S-Series accept both bytes of the 2-byte S-Tag TPID.
Version 8.2.1.0	Introduced on the E-Series ExaScale.
Version 7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

For specific interoperability limitations regarding the S-Tag TPID, refer to the *Dell Networking OS Configuration Guide*.

The four characters you enter in the CLI for number are interpreted, as shown in the following table.

Number	Resulting TPID
1	0x0001
10	0x0010

Number	Resulting TPID
81	0x0081
8100	0x8100

Related Commands	portmode hybrid — sets a port (physical ports only) to accept both tagged and untagged frames. A port configured this way is identified as a hybrid port in report displays. vlan-stack trunk — specifies a Layer 2 port or port channel as a trunk port to the Stackable VLAN network.

vlan-stack trunk

Specify a Layer 2 port or port channel as a trunk port to the Stackable VLAN network.

S6000

Syntax	`vlan-stack trunk` To remove a trunk port designation from the selected interface, use the `no vlan-stack trunk` command.
Defaults	Not configured.
Command Modes	INTERFACE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 8.2.1.0	Introduced on the E-Series ExaScale. C-Series and S-Series accept both bytes of the 2-byte S-Tag TPID.
Version 7.8.1.0	Functionality augmented for C-Series and S-Series to enable multi-purpose use of the port.
Version 7.7.1.0	Functionality augmented for E-Series to enable multi-purpose use of the port.

Version 7.6.1.0	Introduced on the C-Series and S-Series.
E-Series original Command	

Usage Information

Prior to using this command, to place the interface in Layer 2 mode, execute the `switchport` command.

To remove the trunk port designation, first remove the port (using the `no member interface` command) from all stackable VLAN-enabled VLANs.

Starting with Dell Networking OS version 7.8.1.0, a VLAN-Stack trunk port is also allowed to be configured as a tagged port and as an untagged port for single-tagged VLANs. When the VLAN-Stack trunk port is also a member of an untagged VLAN, the port must be in Hybrid mode. Refer to portmode hybrid.

In Example 1, a VLAN-Stack trunk port is configured and then also made part of a single-tagged VLAN.

In Example 2, the tag protocol identifier (TPID) is set to 8848. The “Gi 3/10” port is configured to act as a VLAN-Stack access port, while the “TenGi 8/0” port acts as a VLAN-Stack trunk port, switching stackable VLAN traffic for VLAN 10, while also switching untagged traffic for VLAN 30 and tagged traffic for VLAN 40. (To allow VLAN 30 traffic, the native VLAN feature is required, by executing the `portmode hybrid` command. Refer to portmode hybrid in Interfaces.

Example 1

```
Dell(conf-if-gi-0/42)#switchport
Dell(conf-if-gi-0/42)#vlan-stack trunk
Dell(conf-if-gi-0/42)#show config
!
interface GigabitEthernet 0/42
  no ip address
  switchport
  vlan-stack trunk
  no shutdown
Dell(conf-if-gi-0/42)#interface vlan 100
Dell(conf-if-vl-100)#vlan-stack compatible
Dell(conf-if-vl-100-stack)#member gigabitethernet 0/42
Dell(conf-if-vl-100-stack)#show config
!
interface Vlan 100
  no ip address
  vlan-stack compatible
  member GigabitEthernet 0/42
  shutdown
Dell(conf-if-vl-100-stack)#interface vlan 20
Dell(conf-if-vl-20)#tagged gigabitethernet 0/42
Dell(conf-if-vl-20)#show config
!
interface Vlan 20
  no ip address
  tagged GigabitEthernet 0/42
  shutdown
Dell(conf-if-vl-20)#do show vlan
Codes: * - Default VLAN, G - GVRP VLANs
Q: U - Untagged, T - Tagged
```

```
   x - Dot1x untagged, X - Dot1x tagged
   G - GVRP tagged, M - Vlan-stack

  NUM  Status Description   Q Ports
* 1    Inactive
  20   Active               T Gi 0/42
  100  Active               M Gi 0/42
Dell(conf-if-vl-20)#
```

Example 2

```
Dell(config)#vlan-stack protocol-type 88A8
Dell(config)#interface gigabitethernet 3/10
Dell(conf-if-gi-3/10)#no shutdown
Dell(conf-if-gi-3/10)#switchport
Dell(conf-if-gi-3/10)#vlan-stack access
Dell(conf-if-gi-3/10)#exit

Dell(config)#interface tenGigabitethernet 8/0
Dell(conf-if-te-10/0)#no shutdown
Dell(conf-if-te-10/0)#portmode hybrid
Dell(conf-if-te-10/0)#switchport
Dell(conf-if-te-10/0)#vlan-stack trunk
Dell(conf-if-te-10/0)#exit

Dell(config)#interface vlan 10
Dell(conf-if-vlan)#vlan-stack compatible
Dell(conf-if-vlan)#member Gi 7/0, Gi 3/10, TenGi 8/0
Dell(conf-if-vlan)#exit

Dell(config)#interface vlan 30
Dell(conf-if-vlan)#untagged TenGi 8/0
Dell(conf-if-vlan)#exit
Dell(config)#

Dell(config)#interface vlan 40
Dell(conf-if-vlan)#tagged TenGi 8/0
Dell(conf-if-vlan)#exit
Dell(config)#
```

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Virtual Routing and Forwarding (VRF)

Virtual Routing and Forwarding (VRF) allows multiple instances of a routing table to co-exist on the same router at the same time. Virtual Routing and Forwarding (VRF) is supported on the S-Series platforms.

ip unknown-unicast

Enable IPv4 catch-all route.

S6000

Syntax

```
ip unknown-unicast [vrf vrf-name]
```

To remove the IPv4 catch-all route (0.0.0.0/0) from the LPM route forwarding table in hardware which gets added as a default configuration after the initialization of FIB Agent module, use the `no ip unknown-unicast` command.

Defaults

None

Parameters

vrf *vrf-name*	(Optional) Enter the keyword `vrf` followed by the name of the VRF to enable catch-all routes corresponding to that VRF.

Command Modes

CONFIGURATION

Command History

Version 9.4(0.0)	Introduced on the S−Series.

Usage Information

Use this command to add the IPv4 catch-all route (0.0.0.0/0) in the LPM route forwarding table if it was deleted using the `no ip unknown-unicast` command previously. This will be the default configuration after reload.

ipv6 unknown-unicast

Disable soft forwarding of unknown IPv6 destination packets.

S6000 MXL Switch

Syntax

```
[no] ipv6 unknown-unicast
```

Defaults	Soft forwarding is enabled.
Command Modes	CONFIGURATION
Command History	**Version 9.4(0.0)** Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.
Usage Information	All the default catch-all entries in the longest prefix match (LPM) table collect and transmit all unresolved IPv6 packets to the CPU, even if they are destined for unknown destinations.

description

Enables you to specify a descriptive name for a customer VRF.

S6000

Syntax

`description string`

To delete the descriptive name for a customer VRF, use the `no description string` command.

Parameters

string	Enter a descriptive name for the VRF.

Defaults

None.

Command Modes

VRF MODE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series.

Usage Information

Use this command to specify a descriptive name for a VRF.

ip vrf forwarding

Enables you to attach an interface to a VRF.

S6000

Syntax

`ip vrf forwarding {vrf-name | management}`

To delete an interface associated with a configured VRF, use the `no ip vrf forwarding {vrf-name | management}` command.

Parameters

vrf-name	Enter name of the VRF that you want to associate the interface to.
management	Use this keyword when you want to associate the interface to the management VRF.

Defaults

None (Interface is part of default VRF).

Command Modes

INTERFACE-CONFIG

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z9000.

Usage Information

Use this command to attach an interface to a configured VRF. You can attach an interface to either a non-default VRF or a management VRF. To assign a port-back to a default VRF, remove VRF association from the interface. You can use this only if there is no IP address configured on the interface.

There must be no prior Layer 3 configuration on the interface when configuring VRF.

VRF must be enabled prior to implementing this command.

You can configure an IP subnet or address on a physical or VLAN interface that overlaps the same IP subnet or address configured on another interface only if the interfaces are assigned to different VRFs. If two interfaces are assigned to the same VRF, you cannot configure overlapping IP subnets or the same IP address on them.

Example

```
Dell#configure terminal
Dell(conf)#ip vrf red
Dell(conf-vrf)#description "Red Network"
Dell(conf-vrf)#show config
!
ip vrf red 4
 description "Red Network"
Dell(conf-vrf)#
Dell(conf-if-te-7/45)#int te 7/46
Dell(conf-if-te-7/46)#no shut
Dell(conf-if-te-7/46)#ip vrf forwarding red
Dell(conf-if-te-7/46)#ip add 100.1.1.1/24
Dell(conf-if-te-7/46)#
Dell(conf-if-te-7/46)#
Dell(conf-if-te-7/46)#
Dell(conf-if-te-7/46)#show config
!
interface TenGigabitEthernet 7/46
 ip vrf forwarding red
 ip address 100.1.1.1/24
 no shutdown
Dell(conf-if-te-7/46)#
```

interface management

Associates a management port with a management VRF.

Syntax

`interface management`

To delete the association between a management port and a management VRF, use the `no interface management` command.

Defaults

None.

Command Modes

VRF MODE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z-Series.

Usage Information

Use this command to associate a management port with a management VRF. When you execute this command, the management ports corresponding to both the ACTIVE unit as well as the STANDBY unit are associated with the management VRF.

maximum dynamic-routes

Specify the maximum number of dynamic (protocol) routes a VRF can have.

S6000

Syntax	`maximum dynamic-routes` *`limit`* `{`**warn-threshold** *`threshold-value`* `|` **warning-only**`}` To remove the limit on the maximum number of routes used, use the `no maximum dynamic-routes` command.

Parameters

limit	Maximum number of routes allowed in a VRF. Valid range is from 1 to 16,000 (or maximum allowable for that platform if smaller value).
warning-threshold	Warning threshold value is expressed as a percentage of the limit value. When the number of routes reaches the specified percentage of the limit, a warning message is generated. Valid range is 1 to 100. When warn-threshold is used, once the limit is reached, additional dynamic routes will not be allowed.
warning-only	When the warning-only option is used, a syslog message will be thrown when maximum number of dynamic routes reaches the limit. Additional dynamic routes will still allowed.

Defaults	No limit is set on the maximum number of dynamic routes for a VRF.
Command Modes	CONFIGURATION-VRF
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OSCommand Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Introduced on the S−Series.

Usage Information	If the maximum route limit is not specified for a VRF, then it has unlimited space that extends to the maximum number of entries allowed for the system. This command is not applicable to the default and management VRFs.

show ip vrf

Displays information corresponding to the VRFs that are configured in the system.

Syntax

`show ip [vrf vrf-name]`

Parameters

vrf *vrf-name*	Enter the keyword vrf and then the name of the VRF to display information corresponding to that VRF..

Command Modes

EXEC

EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z9000.

Example

```
show ip vrf
VRF-Name                         VRF-ID Interfaces

default                          0       Te 0/0-13,18-47,
                                         Fo 0/48,52,56,60,
                                         Ma 0/0,
                                         Ma 1/0,
                                         Ma 2/0,
                                         Ma 3/0,
                                         Ma 4/0,
                                         Ma 5/0,
                                         Ma 6/0,
                                         Ma 7/0,
                                         Ma 8/0,
                                         Ma 9/0,
                                         Ma 10/0,
                                         Ma 11/0,
Nu 0,
                                         Vl 1
test1                            1       Te 0/14,16-17
test2                            2       Te 0/15
management                       64


FTOS#show ip vrf test1
VRF-Name                         VRF-ID Interfaces

test1                            1       Te 0/14,16-17
```

show run vrf

Displays configuration information corresponding to all the VRFs in the system.

Syntax

`show run vrf vrf-name`

Parameters

vrf *vrf-name*	Enter the keyword `vrf` and then the name of the VRF..

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Introduced on the S-Series and Z9000.

Usage Information

Use this command to display information from the running-config corresponding to either a specific VRF or all the VRFs in the system.

Example

```
Dell#show run vrf test3
!
ip vrf test3
 description "Banking Customer Chennai"
```

Related Commands

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VLT Proxy Gateway

This chapter describes the VLT Proxy Gateway feature.

proxy-gateway lldp

Configure the LLDP proxy gateway

S6000

Syntax

`proxy-gateway lldp`

Command Modes

VLT DOMAIN

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.

Usage Information

The configuration is cached and sent to LLDP only in one of the following conditions:

1) The port-channel connecting the two VLT domains, across DC, must be a VLT LAG

2) The protocol lldp command is globally enabled

3) The proxy-gateway LLDP configuration is applied.

However, "proxy-gateway lldp" configuration is sent to the Layer 2 application. When LLDP sends an IPC reply message, SWPQ is created towards LLDP to send further updates to LLDP. When the proxy gateway peer-domain-link port-channel command is provisioned, the configuration is sent to LLDP if the port-channel is a VLT port-channel. However it will not check whether the port-channel is up or down. LLDP determines the addition and removal of LAG ports and transmits LLDP packets out accordingly.

Example

```
Dell(conf)#vlt-domain 1
Dell(conf-vlt-domain#proxy-gateway lldp
```

proxy-gateway static

Configure the VLT static proxy gateway

S6000

Syntax	`[no] proxy-gateway static`
Command Modes	VLT DOMAIN
Command History	**Version 9.4(0.0)** Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.
Usage Information	When proxy-gateway static configuration is made, the setting is saved in the Layer 2 application. When you remove the static proxy gateway configuration, each proxy-gateway static mac configured is deleted and also the notification to delete the local destination address (DA) configured is sent to the Layer 2 module. When remote-mac-address *mac-address-identifier* configuration is made, the MAC details are saved. When no remote-mac-address *mac-address-identifier* configuration is made, the MAC details and the local DA information are deleted.

Example

```
Dell(conf)#vlt-domain 1
Dell(conf-vlt-domain#proxy-gateway static
```

remote-mac-address exclude-vlan

Configure the proxy-gateway static entry and exclude a VLAN or a range of VLANs from proxy routing.

S6000

Syntax

```
remote-mac-address mac—address exclude-vlan vlan-range
```

Parameters

remote-mac-address	Specify the remote MAC address for a static proxy gateway.
mac-address	Enter the 48-bit hexadecimal address in nn:nn:nn:nn:nn:nn format.
vlan-range	Enter the member VLANs using comma-separated VLAN IDs, a range of VLAN IDs, a single VLAN ID, or a combination. For example: Comma-separated: 3, 4, 6 Range: 5-10 Combination: 3, 4, 5-10, 8

Command Modes	VLT DOMAIN PROXY GW STATIC
Command History	**Version 9.4(0.0)** Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.
Usage Information	You can configure the remote MAC address of the VLT peer to be associated with the static VLT proxy gateway and exclude a VLAN or a range of VLANs from proxy routing. This parameter is for a static VLT proxy gateway configuration.

Example

```
Dell(conf)#vlt-domain 1
Dell(conf-vlt-domain#proxy-gateway static
Dell(conf-vlt-domain-proxy-gw-static)#remote-mac-address
00:01:e8:06:95:ac exclude-vlan 3
```

peer-domain-link port-channel exclude-vlan

Configure proxy-gateway LLDP, specify a port-channel and a VLAN or range of VLANs, and exclude a VLAN or a range of VLANs from proxy routing.

S6000

Syntax

```
[no] peer-domain-link port-channel interface-identifier
exclude-vlan vlan-range
```

Parameters

port-channel	Configure the proxy-gateway interface port-channel. Port channel range is from 1 to 128.
vlan-range	Enter the member VLANs using comma-separated VLAN IDs, a range of VLAN IDs, a single VLAN ID, or a combination. For example: Comma-separated: 3, 4, 6 Range: 5-10 Combination: 3, 4, 5-10, 8

Command Modes	VLT DOMAIN PROXY GW LLDP
Command History	**Version 9.4(0.0)** Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.
Usage Information	You can configure the port channel interface that must be associated with the LLDP proxy gateway and exclude a VLAN or a range of VLANs from proxy routing. This parameter is for an LLDP proxy gateway configuration.

Example

```
Dell(conf)#vlt-domain 1
Dell(conf-vlt-domain)#proxy-gateway lldp
Dell(conf-vlt-domain-proxy-gw-lldp)#peer-domain-link port-
channel 20 exclude-vlan 3
```

proxy-gateway peer-timeout

Configure the proxy-gateway VLT peer timeout value.

S6000

Syntax `[no] peer-timeout value`

Parameters

value	Enter the timeout value in seconds. The range is from 1 to 65535. The default is infinity.

Command Modes VLT DOMAIN PROXY GW LLDP

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.

Usage Information In a square VLT topology with only one link connecting remote peers, a node must stop sending its VLT peer MAC address ("vlt-peer-mac transmit" enabled) when the VLT peer is down. If you configure this time out interval, it will keep sending its peer's MAC address until the timer expires.

Example

```
Dell(conf-vlt-domain-proxy-gw-lldp)# peer-timeout 5
```

vlt-peer-mac transmit

Configures a peer to sent its VLT peer's MAC address along with its LLDP TLV.

S6000

Syntax `[no] vlt-peer-mac transmit`

Command Modes VLT DOMAIN PROXY GW LLDP

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.

Usage Information	In a square VLT topology with only one link connecting remote peers, if you configure this command, any node has to send its VLT peer's MAC address along with its own MAC address to the remote VLT domain. By default, a node will send only its own MAC address to the remote VLT domain. This parameter is applicable for an LLDP proxy gateway configuration.
Example	`Dell(conf-vlt-domain-proxy-gw-lldp)# vlt-peer-mac transmit`

show vlt-proxy-gateway

Display the VLT proxy gateway configuration.

S6000

Syntax

```
show vlt-proxy-gateway info {lldp | static}
```

Parameters

lldp	Display details about the LLDP VLT proxy gateway configuration
static	Display details about the static VLT proxy gateway configuration

Command Modes

EXEC

EXEC Privilege

Command History

Version 9.4(0.0)	Introduced on the S4810, S4820T, S6000, Z9000, and MXL Switch.

Usage Information

At any point of time the proxy-gateway feature may go operationally down for the following reasons,

1) LLDP globally disabled

2) LLDP disabled per port

3) VLT port-channel is down

5) LLDP neighbor down

So, the proxy-gateway feature could be operationally down though properly configured and this will be reported in the “show command”.

When more than one VLT port-channel terminates on the same TOR, output of the `show VLT proxy-gateway info lldp` command may show the port-channel id incorrectly.

Example

```
Dell(conf)#do sh vlt proxy-gateway info static
Mac Address           Exclude Vlan
-----------           ------------
00:01:e8:8b:1c:c0

Dell#show vlt proxy-gateway info lldp
LagId      Mac Address           Exclude Vlan
-----      -----------           ------------
Po 55      00:01:e8:8a:e8:f7     3,7-8                << Macs
learnt via port-channel 55
Po 55      00:01:e8:8b:1c:c0     3,7-8
```

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Virtual Link Trunking (VLT)

Virtual link trunking (VLT) is supported on the S6000 platform.

VLT allows physical links between two chassis to appear as a single virtual link to the network core. VLT eliminates the requirement for Spanning Tree protocols by allowing link aggregation group (LAG) terminations on two separate distribution or core switches, and by supporting a loop-free topology. VLT provides Layer 2 multipathing, creating redundancy through increased bandwidth and enabling multiple parallel paths between nodes and load-balancing traffic where alternative paths exist.

NOTE: When you launch the VLT link, the VLT peer-ship is not established if any of the following is **TRUE**:

- The VLT System-MAC configured on both the VLT peers do not match.
- The VLT Unit-Id configured on both the VLT peers are identical.
- The VLT System-MAC or Unit-Id is configured only on one of the VLT peers.
- The VLT domain ID is not the same on both peers.

If the VLT peer-ship is already established, changing the System-MAC or Unit-Id does not cause VLT peer-ship to go down.

Also, if the VLT peer-ship is already established and the VLT Unit-Id or System-MAC are configured on both peers, then changing the CLI configurations on the VLT Unit-Id or System-MAC is rejected if any of the following become **TRUE**:

- After making the CLI configuration change, the VLT Unit-Id becomes identical on both peers.
- After making the CLI configuration change, the VLT System-MAC do not match on both peers.

When the VLT peer-ship is already established, you can remove the VLT Unit-Id or System-MAC configuration from either or both peers. However, removing configuration settings can cause the VLT ports to go down if you configure the Unit-Id or System-MAC on only one of the VLT peers.

back-up destination

Configure the IPv4 or IPv6 address of the management interface on the remote VLT peer to be used as the endpoint of the VLT backup link for sending out-of-band hello messages.

S6000

Syntax

```
back-up destination {[ipv4–address] | [ipv6 ipv6–address]
[interval seconds]}
```

Parameters

ipv4–address	Enter the IPv4 address of the backup destination.

ipv6	Enter the keyword `ipv6` then an IPv6 address in the X:X:X:X::X format.
interval *seconds*	Enter the keyword `interval` to specify the time interval to send hello messages. The range is from 1 to 5 seconds. The default is 1 second.

Defaults **1 second**

Command Modes VLT DOMAIN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.2(0.2)	Added support for IPv6.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

clear vlt statistics

Clear the statistics on VLT operations.

S6000

Syntax

```
clear vlt statistics [arp | domain | igmp-snoop | mac |
multicast | ndp]
```

Parameters

domain	Clear the VLT statistics for the domain.
multicast	Clear the VLT statistics for multicast.
mac	Clear the VLT statistics for the MAC address.
arp	Clear the VLT statistics for ARP.
igmp-snoop	Clear the VLT statistics for IGMP snooping.
ndp	Clear the VLT statistics for NDP.

Command Modes	EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.2(0.2)	Added `multicast` and `ndp` parameters.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Example

```
VLT ARP Statistics
----------------
ARP Tunnel Pkts sent:0
ARP Tunnel Pkts Rcvd:0
ARP-sync Pkts Sent:0
ARP-sync Pkts Rcvd:0
ARP Reg Request sent:19
ARP Reg Request rcvd:10
```

Related Commands

show vlt statistics — displays statistics on VLT operations.

delay-restore

Configure the delay in bringing up VLT ports after reload or peer-link restoration between the VLT peer switches.

S6000

Syntax	`delay-restore`

Parameters

delay-restore	Enter the amount of time, in seconds, to delay bringing up the VLT ports after the VLTi device is reloaded or after the peer-link is restored between VLT peer switches. The range from 1 to 1200. The default is **90 seconds**.

Defaults	Not configured.

Command Modes	VLT DOMAIN

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S8420T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information

To delay the system from bringing up the VLT port for a brief period to allow IGMP Snooping and Layer 3 routing protocols to converge, use the `delay-restore` parameter. Use this feature:

- after a VLT device is reloaded.
- if the Peer VLT device was up at the time the VLTi link failed to the time when it was restored.

Related Commands

show vlt statistics — displays statistics on VLT operations.

lacp ungroup member-independent

Prevent possible loop during the bootup of a VLT peer switch or a device that accesses the VLT domain.

S6000

Syntax

```
lacp ungroup member-independent {vlt | port-channel}
```

Parameters

port-channel	Force all LACP port-channel members to become switchports.
vlt	Force all VLT LACP members to become switchports.

Defaults	Not configured.
Command Modes	CONFIGURATION

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Added port-channel parameter on the S4810.
Version 8.3.8.0	Introduced on the S4810.

Usage Information

LACP on the VLT ports (on a VLT switch or access device), which are members of the virtual link trunk, is not brought up until the VLT domain is recognized on the access device.

On the S4810, during boot-up in a stacking configuration, the system must be able to reach the DHCP server with the boot image and configuration image. During boot-up, only untagged DHCP requests are sent to the DHCP server to receive an offer on static LAGs between switches. The DHCP server must be configured to start in BMP mode. If switches are connected using LACP port-channels like the VLT peer and Top of Rack (ToR), use the **port-channel** parameter on the ToR-side configuration to allow member ports of an ungrouped LACP port-channel to inherit vlan membership of that port channel to ensure untagged packets that are sent by a VLT peer device reach the DHCP server located on the ToR.

To ungroup the VLT and port-channel configurations, use the **no lacp ungroup member independent** command on a VLT port channel, depending on whether the port channel is VLT or non-VLT.

Example

```
Dell(conf)#lacp ungroup member-independent ?
port-channel              LACP port-channel members become
switchports
vlt                                 All VLT LACP members
become switchports
```

multicast peer-routing timeout

Configure the time for a VLT node to retain synced multicast routes or synced multicast outgoing interface (OIF) after a VLT peer node failure.

S6000

Syntax	`multicast peer-routing timeout` *`value`* To restore the default value, use the `no multicast peer-routing timeout` command.
Parameters	*value* — Enter the timeout value in seconds. The range is from 1 to 1200. The default is 150.
Command Modes	VLT DOMAIN (conf-vlt-domain)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.
Version 9.0.2.0	Introduced on the S6000.

peer-link port-channel

Configure the specified port channel as the chassis interconnect trunk between VLT peers in the domain.

Syntax

`peer-link port-channel` *`port-channel-number`* `{peer-down-vlan` *`vlan id`*`}`

Parameters

port-channel-number	Enter the port-channel number that acts as the interconnect trunk.
peer-down-vlan *vlan id*	Enter the keyword `peer-down-vlan` then a VLAN ID to configure the VLAN that the VLT peer link uses when the VLT peer is down.

Defaults

Not configured.

Command Modes

VLT DOMAIN

Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Added support for the **peer-down-vlan** parameter.
Version 8.3.8.0	Introduced on the S4810.

Usage Information	To configure the VLAN from where the VLT peer forwards packets received over the VLTi from an adjacent VLT peer that is down, use the **peer-down-vlan** parameter. When a VLT peer with bare metal provisioning (BMP) is booting up, it sends untagged DHCP discover packets to its peer over the VLTi. To ensure that the DHCP discover packets are forwarded to the VLAN that has the DHCP server, use this configuration.

peer-routing

Enable L3 VLT peer-routing. This command is applicable for both IPV6/ IPV4.

S6000

Syntax	`peer-routing` To disable L3 VLT peer-routing, use the `no peer-routing` command.
Defaults	Disabled.
Command Modes	VLT DOMAIN (conf-vlt-domain)
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added the support for IPV6 / IPV4.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.

Version 9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.

peer-routing-timeout

Configure the delay after which peer routing is disabled when the peer is unavailable. This command is applicable for both IPV6/ IPV4.

S6000

Syntax

`peer-routing-timeout *value*`

To restore the default value, use the `no peer-routing-timeout` command.

Parameters

value	Enter the timeout value in seconds. The range is from 1 to 65535. The default value is 0 (no timeout).

Command Modes

VLT DOMAIN (conf-vlt-domain)

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4(0.0)	Added the support for IPV6 / IPV4.
Version 9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.
Version 9.0.2.0	Introduced on the S6000.

Usage Information

When the timer expires, the software checks to see if the VLT peer is now available. If the VLT peer is not available, peer-routing is disabled on that peer.

primary-priority

Assign the priority for master election among VLT peers.

S6000

Syntax

`[no] primary-priority`

Parameters

value	To configure the primary role on a VLT peer, enter a lower value than the priority value of the remote peer. The range is from 1 to 65535.

Default	**32768**
Command Modes	VLT DOMAIN
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Usage Information	After you configure the VLT domain on each peer switch on both sides of the interconnect trunk, by default, the Dell Networking OS software elects a primary and secondary VLT peer device. To reconfigure the primary role of VLT peer switches, use the `priority` command.

show vlt brief

Displays summarized status information about VLT domains currently configured on the switch.

S6000

Syntax	`show vlt brief`
Default	Not configured.
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Usage Information

The version shown in the `show vlt brief` output command displays the VLT version number which is different from the Dell Networking OS version number. VLT version numbers are begin with odd numbers such as 3 or 5.

Example (Brief)

```
Dell (conf) #show vlt brief
 VLT Domain Brief
----------------------------

Domain ID:                                10
Role:                                        Primary
Role Priority:                            32768
ICL Link Status:                        Up
Heart Beat Status:                    Not Established
VLT Peer Status:                        Up
Version:                                    5 (1)
Local System MAC address:         00:01:e8:8b:14:3c
Remote System MAC address:         00:01:e8:8b:15:20
Remote Sytem Version:                 5 (1)
Delay-Restore timer:                90 seconds
```

show vlt backup-link

Displays information on the backup link operation.

S6000

Syntax

`show vlt backup-link`

Default

Not configured.

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Example

```
Dell_VLTpeer1# show vlt backup-link

VLT Backup Link
-----------------
Destination:                 10.11.200.18
Peer HeartBeat status:       Up
HeartBeat Timer Interval:    1
HeartBeat Timeout:           3
UDP Port:                    34998
HeartBeat Messages Sent:     1026
HeartBeat Messages Received: 1025
```

show vlt counters

Displays the counter information.

S6000

Syntax

```
show vlt counters [arp| igmp-snoop | interface | mac | ndp]
```

Parameters

arp	Enter the keyword `arp` to display the ARP counter information for the VLT.
igmp-snoop	Enter the keywords `igmp-snoop` to display the igmp-snooping counter information for the VLT.
interface	Enter the keyword `interface` to display the interface counter information for the VLT.
mac	Enter the keyword `mac` to display the MAC address counter information for the VLT.
ndp	Enter the keyword `ndp` to display the VLT counter information for NDP.

Default Not configured.

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Usage Information If you do not add a parameter such as `arp` or `mac`, the output displays all of the counters.

Example

```
Dell# show vlt counter
Total VLT counters
```

```
-------------------------
L2 Total MAC-Address Count :
IGMP MRouter Vlans count :
IGMP Mcast Groups count :
ARP entries count :
```

Example (igmp-snoop)

```
Dell# show vlt counter igmp-snoop
Total IGMP VLT counters
----------------------
IGMP MRouter Vlans count : 1
IGMP Mcast Groups count  : 5
```

Example (igmp-snoop interface port-channel)

```
Dell#show vlt counter igmp-snoop interface port-channel 2
VLT Port-ID: 2 IGMP Counter
-----------------------
IGMP MRouter Vlans count : 0
IGMP Mcast Groups count  : 5

Dell# show vlt counter igmp-snoop interface port-channel 100
VLT Port-ID: 100 IGMP Counter
-----------------------
IGMP MRouter Vlans count : 1
IGMP Mcast Groups count  : 0
Ve
```

Example (NDP and Non-VLT ARP)

```
Dell#show vlt counters
Total VLT Counters
-------------------
L2 Total MAC-Address Count:             2
Total Arp Entries Learnt :              0
Total Arp Entries Synced :              0
Total Non-VLT Arp entries Learnt:       0
Total Non-VLT Arp Entries Synced        0
IGMP MRouter Vlans count :
IGMP Mcast Groups count :
Total VLT Ndp Entries Learnt :          2
Total VLT Ndp Entries Synced :          0
Total Non-VLT Ndp Entries Learnt :      0
Total Non-VLT Ndp Entries Synced :      0
```

show vlt detail

Displays detailed status information about VLT domains currently configured on the switch.

S6000

Syntax	`show vlt detail`
Default	Not configured.
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Example

```
Dell# Dell(conf-if-vl-100)#show vlt detail
Local LAG Id Peer LAG Id Local Status Peer Status Active VLANs
------------ ----------- ------------ ------------
-------------
10           10          UP           UP        100, 200, 300,
400,
```

show vlt inconsistency

Display run-time inconsistencies in the incoming interface (IIF) for spanned multicast routes.

S6000

Syntax

```
show vlt inconsistency ip mroute
```

Command Modes

EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.

Example

```
Dell#show vlt inconsistency ip mroute
Spanned Multicast Routing IIF Inconsistency

Multicast Route                  LocalIIF      PeerIIF
---------------                  ----------    ---------
(22.22.22.200, 225.1.1.2)         VLAN 5       VLAN 6
(*, 225.1.1.2)                    VLAN 15      te 0/5
Dell#
```

show vlt mismatch

Display mismatches in VLT parameters.

S6000

Syntax	`show vlt mismatch`
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.2(0.2)	Introduced on the Z9000, S4810, and S4820T.

Example

```
Dell#show vlt mismatch
Domain
-----------
Parameters        Local             Peer
------------     -----------       ---------
    Unit-ID       0                  15

Vlan-config
------------
Vlan-ID      Local Mode     Peer Mode
---------   ------------ -----------

     100             --                 L3

Vlan IPV4 Multicast Status
--------------------------
  Vlan-ID      Local Status       Peer Status
  --------     ------------       -----------

  4094              Active              Inactive

Dell#
```

show vlt role

Displays the VLT peer status, role of the local VLT switch, VLT system MAC address and system priority, and the MAC address and priority of the local VLT device.

S6000

Syntax	`show vlt role`
Default	Not configured.
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Example

```
Dell_VLTpeer1# show vlt role

VLT Role
----------
VLT Role:                    Primary
System MAC address:          00:01:e8:8a:df:bc
System Role Priority:        32768
Local System MAC address:    00:01:e8:8a:df:bc
Local System Role Priority: 32768

Dell_VLTpeer2# show vlt role

VLT Role
----------
VLT Role:                    Secondary
System MAC address:          00:01:e8:8a:df:bc
System Role Priority:        32768
Local System MAC address:    00:01:e8:8a:df:e6
Local System Role Priority: 32768
```

show vlt statistics

Displays statistics on VLT operations.

S6000

Syntax

```
show vlt statistics [arp | domain | igmp-snoop | mac |
multicast | ndp]
```

Parameters

domain	Display the VLT statistics for the domain.
multicast	Display the VLT statistics for multicast.
mac	Display the VLT statistics for the MAC address.
arp	Display the VLT statistics for ARP.
igmp-snoop	Display the VLT statistics for IGMP snooping.
ndp	Display the VLT statistics for NDP.

Default Not configured.

Command Modes EXEC

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.2)	Added parameters `multicast` and `ndp`
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Added support in the output for ARP, MAC, and IGMP snooping.
Version 8.3.8.0	Introduced on the S4810.

Related Commands clear vlt statistics — clears the statistics on VLT operations.

Example

NOTE: The following example shows the statistics for *all* of the VLT parameters. If you enter a specific keyword, such as `mac`, only the statistics for that VLT parameter displays.

```
Dell_VLTpeer1#show vlt statistics
VLT Statistics
----------------
HeartBeat Messages Sent:     930
HeartBeat Messages Received: 909
ICL Hello's Sent:            927
ICL Hello's Received:        910
Domain Mismatch Errors:      0
Version Mismatch Errors:     0
Config Mismatch Errors:      0

VLT MAC Statistics
----------------
L2 Info Pkts sent:6, L2 Mac-sync Pkts Sent:0
L2 Info Pkts Rcvd:3, L2 Mac-sync Pkts Rcvd:2
L2 Reg Request sent:1
L2 Reg Request rcvd:2
L2 Reg Response sent:1
L2 Reg Response rcvd:1

VLT Igmp-Snooping Statistics
-------------------------------
IGMP Info Pkts sent:     4
IGMP Info Pkts Rcvd:     1
IGMP Reg Request sent:   1
IGMP Reg Request rcvd:   2
IGMP Reg Response sent:  1
IGMP Reg Response rcvd:  1
IGMP PDU Tunnel Pkt sent: 5
IGMP PDU Tunnel Pkt rcvd: 10
IGMP Tunnel PDUs sent:    10
IGMP Tunnel PDUs rcvd:    19

VLT Multicast Statistics
-------------------------------
Info Pkts Sent:                 4
Info Pkts Rcvd:                 2
Reg Request Sent:               2
Reg Request Rcvd:               2
Reg Response Sent:              1
Reg Response Rcvd:              0
Route updates sent to Peer:     0
Route updates rcvd from Peer:   0
Route update pkts sent to Peer:  0
Route update pkts rcvd from Peer: 0

VLT NDP Statistics
--------------------
NDP NA VLT Tunnel Pkts sent:16
NDP NA VLT Tunnel Pkts Rcvd:46
NDP NA Non-VLT Tunnel Pkts sent:0
NDP NA Non-VLT  Tunnel Pkts Rcvd:0
Ndp-sync Pkts Sent:144
Ndp-sync Pkts Rcvd:105
Ndp Reg Request sent:25
Ndp Reg Request rcvd:24
```

show vlt statistics igmp-snoop

Displays the informational packets and IGMP control PDUs that are exchanged between VLT peer nodes.

S6000

Syntax	`show vlt statistics igmp-snoop`
Default	Not configured.
Command Modes	EXEC
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.12.0	Introduced on the S4810.

Example

```
Dell_VLTpeer1#show vlt statistics igmp-snoop
VLT Igmp-Snooping Statistics
-------------------------------
IGMP Info Pkts sent:     4
IGMP Info Pkts Rcvd:     1
IGMP Reg Request sent:   1
IGMP Reg Request rcvd:   2
IGMP Reg Response sent:  1
IGMP Reg Response rcvd:  1
IGMP PDU Tunnel Pkt sent:5
IGMP PDU Tunnel Pkt rcvd:10
IGMP Tunnel PDUs sent:   10
IGMP Tunnel PDUs rcvd:   19
```

unit-id

Explicitly configure the default unit ID of a VLT peer switch.

S6000

Syntax	`unit-id [0 | 1]`
Parameters	

0 | 1	Configure the default unit ID of a VLT peer switch. Enter `0` for the first peer or enter `1` for the second peer.

Defaults	Automatically assigned based on the MAC address of each VLT peer. The peer with the lower MAC address is assigned unit 0; the peer with the higher MAC address is assigned unit 1.
Command Modes	VLT DOMAIN
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Usage Information	When you create a VLT domain on a switch, Dell Networking OS automatically assigns a unique unit ID (0 or 1) to each peer switch. The unit IDs are used for internal system operations. Use the `unit-id` command to explicitly configure the unit ID of a VLT peer. Configure a different unit ID (0 or 1) on each peer switch. To minimize the time required for the VLT system to determine the unit ID assigned to each peer switch when one peer reboots, use this command.

vlt domain

Enable VLT on a switch, configure a VLT domain, and enter VLT-domain configuration mode.

S6000

Syntax	`vlt domain` *`domain-id`*
Parameters	

domain-id	Enter the Domain ID number. Configure the same domain ID on the peer switch. The range of domain IDs is from 1 to 1000.

Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Usage Information

The VLT domain ID must be the same between the two VLT devices. If the domain ID is not the same, a syslog message is generated and VLT does not launch.

Related Commands

show vlt — uses the `show vlt brief` command to display the delay-restore value.

vlt-peer-lag port-channel

Associate the port channel to the corresponding port channel in the VLT peer for the VLT connection to an attached device.

S6000

Syntax

`vlt-peer-lag port-channel` *`id-number`*

Parameters

id-number	Enter the respective vlt port-channel number of the peer device.

Defaults

Not configured.

Command Modes

INTERFACE PORT-CHANNEL

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.2(0.0)	Introduced on the M I/O Aggregator. This command is supported in Programmable-Mux (PMUX) mode only.
Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.

Version 8.3.8.0	Introduced on the S4810.

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Virtual Extensible LAN (VXLAN)

Virtual Extensible LAN (VXLAN) is supported on the S6000 platform.

feature vxlan

Enable VXLAN configuration globally on the platform.

S6000

Syntax	`feature vxlan` To disable the VXLAN, use the `no feature vxlan` command.
Defaults	Disabled
Command Modes	CONFIGURATION
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Usage Information	You must configure feature VXLAN to configure VXLAN-instance.
Related Commands	vxlan-instance — Enable VXLAN Instance configuration on the platform.

debug vxlan

Debug messages between the Gateway and Controller.

S6000

Syntax	`debug vxlan`
Defaults	Disabled

Command Modes	EXEC Privilege
Command History	Version 9.4(0.0) — Introduced on the S6000.

fail-mode

Configures failure-mode on the platform.

S6000

Syntax	`fail-mode secure` To disable the `fail-mode secure`, use the `no fail-mode secure`command.
Parameters	**secure** — Enter the keyword `secure` to delete all its database and hardware flows/resources, when the VTEP loses connectivity with the controller.
Defaults	non secure
Command Modes	VXLAN INSTANCE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. Version 9.4.(0.0) — Introduced on the S6000.
Usage Information	
Related Commands	vxlan-instance— Enable VXLAN Instance configuration on the platform.

vxlan-instance

Enable VXLAN Instance configuration on the platform.

S6000

Syntax	`vxlan-instance` *`instance ID`* To enable the `vxlan-instance` command, use the `[no] shut` command.

To delete `vxlan-instance` from the system, use `no vxlan-instance 1` command.

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Defaults Disabled

Command Modes CONFIGURATION

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Usage Information You must configure VXLAN globally before using VXLAN-instance.

Related Commands feature vxlan—Enable VXLAN configuration globally on the platform.

vxlan-instance (VAP)

To configure a VXLAN-Access Port (VAP) in to VXLAN-instance

S6000

Syntax

```
vxlan-instance instance ID
```

To unconfigure VAP, use the `no vxlan-instance 1` command.

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Defaults Disabled

Command Modes INTERFACE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Usage Information	You must disable `vxlan-instance` before unconfiguring VAP.
Related Commands	feature vxlan—Enable VXLAN configuration globally on the platform.

max_backoff

Configures time to wait between connection attempts with controller.

S6000

Syntax `max_backoff` *`time`*

Parameters

time	Enter the time in milliseconds. The range is from 1000-180000. The default value is 30000.

Defaults 30000

Command Modes VXLAN INSTANCE

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Usage Information The retry interval value caps at the value configured on the max-backoff.

Related Commands vxlan-instance — Enable VXLAN Instance configuration on the platform.

gateway-ip

Configures gateway IP address on the platform.

S6000

Syntax `gateway-ip` *`IP address`*

Parameters

IP address	Enter the IP address of the gateway for the VXLAN instance.

Defaults	Disabled
Command Modes	VXLAN INSTANCE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Usage Information	
Related Commands	vxlan-instance— Enable VXLAN Instance configuration on the platform.

controller

Configures controller for the VXLAN instance on the platform.

S6000

Syntax

```
controller controller ID ip address port port-number tcp|ptcp|
pssl|ssl
```

Parameters

controller ID	Enter the controller ID.
ip address	Enter the IP address of the controller.
port *port-number*	(OPTIONAL) Enter the keyword `port` and the port number. The range is from 1 to 6632. The default port number is 6632.
tcp	(OPTIONAL) Enter the keyword `tcp` to configure tcp connection to controller.
ptcp	(OPTIONAL) Enter the keyword `ptcp` to configure passive tcp connection to controller.
pssl	(OPTIONAL) Enter the keyword `pssl` to configure passive ssl connection to controller.
ssl	(OPTIONAL) Enter the keyword `ssl` to configure ssl connection to controller (Default).

Defaults	Disabled

Command Modes	VXLAN INSTANCE
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Usage Information

Related Commands vxlan-instance — Enable VXLAN instance configuration on the platform.

show vxlan vxlan-instance

Displays information related to Network Virtualization Overlay (NVO) Gateway.

S6000

Syntax `show vxlan vxlan-instance instance ID`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Command Modes

- EXEC
- EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Example

```
Dell#show vxlan vxlan-instance 1
Instance          : 1
Admin State       : enabled
Management IP     : 192.168.200.200
Gateway IP        : 3.3.3.3
MAX Backoff       : 30000
Controller 1      : 192.168.122.6:6632 ssl (connected)
Fail Mode         : secure
Port List         :
  Fo 0/4     Te 0/16    Te 0/80    Po 2
```

Related Commands	vxlan-instance- Enable VXLAN Instance configuration on the platform.

show running-config vxlan

Displays the configuration information of the VXLAN on S6000.

S6000

Syntax

```
show running-config vxlan
```

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Example

```
Dell#show running-config vxlan
!
feature vxlan
!
vxlan-instance 1
gateway-ip 3.3.3.3
fail-mode secure
controller 1 192.168.122.6 port 6632 ssl
no shutdown
```

Related Commands	vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance unicast-mac-remote

Displays the information of the remote unicast MACs associated with the logical network related to Network Virtualization Overlay (NVO) Gateway.

S6000

Syntax

```
show vxlan vxlan-instance instance ID unicast-mac-remote
[logical-network name | vnid VNID]
```

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

name	(Optional) Enter the name of VXLAN logical network with a maximum length of 30 characters.
vnid*VNID*	(Optional) Enter the keyword `vnid` and then enter the ID of the VXLAN. The range is from 1 to 16777215.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Example

```
Dell# show vxlan vxlan-instance <1> unicast-mac-remote
Total Local Mac Count:    1
VNI              MAC                          TUNNEL
4656           00:00:01:00:00:01     36.1.1.1
```

Related Commands

vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance unicast-mac-local

Displays the information of the local unicast MAC associated with the logical network related to Network Virtualization Overlay (NVO) Gateway.

S6000

Syntax

```
show vxlan vxlan-instance instance ID unicast-mac-local
[logical—network name | vnid VNID]
```

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
name	(Optional) Enter the name of VXLAN logical network with a maximum length of 30 characters.
vnid *VNID*	(Optional) Enter the keyword `vnid` and enter the ID of the VXLAN. The range is from 1 to 16777215.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Example

```
Dell# show vxlan vxlan-instance <1> unicast-mac-local
Total Local Mac Count:    5
VNI              MAC                          PORT      VLAN

4656            00:00:02:00:03:00     Te 0/17   0
4656            00:00:02:00:03:01     Te 0/17   0
4656            00:00:02:00:03:02     Te 0/17   0
4656            00:00:02:00:03:03     Te 0/17   0
4656            00:00:02:00:03:04     Te 0/17   0
```

Related Commands

vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance statistics interface

Displays the port VLAN statistics information related to Network Virtualization Overlay (NVO) Gateway.

S6000

Syntax

```
show vxlan vxlan-instance instance ID statisitics
interface  interface
```

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
interface	Enter the following keywords and slot/port or number information: • For a 40-Gigabit Ethernet interface, enter the keyword `fortyGigE` then the slot/port information and then followed by the Vlan ID. The Vlan ID ranges from 0 to 4095. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information, and then followed by the Vlan ID. The Vlan ID ranges from 0 to 4094. • For a Port Channel, enter the keywords `port-channel`.

Defaults

Disabled

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Example

```
Dell#show vxlan vxlan-instance 1 statistics interface
fortyGigE 0/124 100

Port : Fo 0/124 Vlan : 100

Rx Packets : 13

Rx Bytes : 1317

Tx Packets : 13

Tx Bytes : 1321
```

Related Commands

vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance physical-locator

Displays physical locators related to Network Virtualization Overlay (NVO) Gateway.

S6000

Syntax

```
show vxlan vxlan-instance instance ID physical—locator vtep-ip
A.B.C.D
```

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
A.B.C.D	Enter the IP address of the VTEP.

Defaults

Disabled

Command Modes

VXLAN INSTANCE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Example

```
Dell#show vxlan vxlan-instance 1 physical-locator
Instance : 1
Tunnel   : count 1
    36.1.1.1 : vxlan_over_ipv4 (up)
```

Related Commands

vxlan-instance- Enable VXLAN Instance configuration on the platform.

show vxlan vxlan-instance logical network

Displays logical network information related to Network Virtualization Overlay (NVO) Gateway.

S6000

Syntax

`show vxlan vxlan-instance` *`instance ID`* `logical-network [name` *`name`*`]`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.
name *name*	(OPTIONAL) Enter the keyword `name` and enter the name of VXLAN logical network up to a length of maximum 30 characters.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

Version 9.4.(0.0)	Introduced on the S6000.

Example

```
Dell#show vxlan vxlan-instance 1 logical-network
Instance        : 1
Total LN count  : 1
  Name                                                     VNID
  bffc3be0-13e6-4745-9f6b-0bcbc5877f01    4656

Dell#$n-instance 1 logical-network n 2a8d5d19-8845-4365-
ad04-243f0b6df252
Name : 2a8d5d19-8845-4365-ad04-243f0b6df252
Description :
Tunnel Key : 2
```

```
VFI : 28674
Unknown Multicast MAC Tunnels:
    192.168.122.133 : vxlan_over_ipv4 (up)
Port Vlan Bindings:
    Te 0/80: VLAN: 0 (0x80000001),
    Fo 0/124: VLAN: 0 (0x80000004),
```

Related Commands vxlan-instance- Enable VXLAN Instance configuration on the platform.

clear vxlan vxlan-instance statistics

Syntax `clear vxlan vxlan-instance instance ID statistics`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*

Version 9.4.(0.0)	Introduced on the S6000.

clear mac-address-table dynamic all

Clear the MAC address table of all MAC address learned dynamically. It clears both MAC address of the VXLAN and legacy VLAN.

Syntax `clear mac-address-table dynamic all`

Parameters

instance ID	Enter the VXLAN instance ID. The platform supports only the instance ID *1* in the initial release.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*

Version 9.4.(0.0)	Introduced on the S6000.

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Virtual Router Redundancy Protocol (VRRP)

Virtual router redundancy protocol (VRRP) is supported by the Dell Networking operating system on the S6000 platform.

IPv4 VRRP Commands

The following are IPv4 VRRP commands.

advertise-interval

Set the time interval between VRRP advertisements.

S6000

Syntax

```
advertise-interval {seconds | centisecs centisecs }
```

To return to the default settings, use the `no advertise-interval` command.

Parameters

seconds	Enter a number of seconds. The range is from 1 to 255. The default is **1 second**.
centisecs *centisecs*	Enter the keyword `centisecs` followed by the number of centisecs in multiple of 25 centisecs. The range is `25` to `4075` centisecs in multiples of `25` centisecs.

Defaults

1 second or 100 centisecs.

Command Modes

INTERFACE-VRRP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for centisecs on the Z9000, S6000, S4820T, S4810, and MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

Dell Networking recommends keeping the default setting for this command. If you do change the time interval between VRRP advertisements on one router, change it on all routers.

authentication-type

Enable authentication of VRRP data exchanges.

S6000

Syntax

`authentication-type simple [encryption-type] password`

To delete an authentication type and password, use the `no authentication-type` command.

Parameters

simple	Enter the keyword `simple` to specify simple authentication.
encryption-type	(OPTIONAL) Enter one of the following numbers: • `0` (zero) specifies an un-encrypted authentication data follows. • `7` (seven) specifies a hidden authentication data follows. • `LINE` is the un-encrypted (cleartext) authentication data.
password	Enter a character string up to eight characters long as a password. If you do not enter an encryption-type, the password is stored as clear text.

Defaults

Not configured.

Command Modes

VRRP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information	The given password is encrypted by the system and the `show config` displays an encrypted text string for any of the encrypted typed used.

clear counters vrrp

Clear the counters maintained on VRRP operations.

S6000

Syntax	`clear counters vrrp [`*`vrrp-id`*`] [ipv6] [vrf `*`vrf-name`*`]`
Parameters	

vrrp-id	(OPTIONAL) Enter the number of the VRRP group ID. The range is from 1 to 255.
ipv6	(OPTIONAL) Enter the keyword `ipv6` to clear counters from the IPv6 VRRP group.
vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to clear counters that are maintained on the VRRP operations corresponding to that VRF.

Command Modes	EXEC Privilege
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.

Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell#clear counters vrrp vrf jay
Clear "show vrrp" counters of all vrrp groups on all
interfaces in VRF jay [confirm] yes
```

debug vrrp

Allows you to enable debugging of VRRP.

S6000

Syntax

`debug vrrp` *`interface`* `[`*`vrrp-id`*`] {all | bfd | database | interface | ipv6 | packets | state | timer}`

To disable debugging, use the `no debug vrrp` *`interface`* `[`*`vrrp-id`*`] {all | bfd | database | interface | ipv6 | packets | state | timer}` command.

Parameters

interface	Enter the following keywords and slot/port or number information • For Port Channel interface types, enter the keywords `port-channel` then the number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a 40-Gigabit Ethernet interface, enter the keyword `FortyGigabitEthernet` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then the VLAN ID. The VLAN ID range is from 1 to 4094.
vrrp-id	(OPTIONAL) Enter a number from 1 to 255 as the VRRP group ID.
all	Enter the keyword `all` to enable debugging of all VRRP groups.
bfd	Enter the keyword `bfd` to enable debugging of VRRP BFD interactions.
database	Enter the keyword `database` to enable debugging of configuration changes.
interface	Enter the keyword `interface` to enable debugging of interface state changes..

ipv6	Enter the keyword `ipv6` to enable debugging for IPv6.
packets	Enter the keyword `packets` to enable debugging of VRRP control packets.
state	Enter the keyword `state` to enable debugging of VRRP state changes.
timer	Enter the keyword `timer` to enable debugging of the VRRP timer.

Command Modes EXEC Privilege

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information If no options are specified, debug is active on all interfaces and all VRRP groups.

description

Configure a short text string describing the VRRP group.

S6000

Syntax `description` *`text`*

To delete a VRRP group description, use the `no description` command.

Parameters

text	Enter a text string up to 80 characters long.

Defaults Not enabled.

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

disable

Disable a VRRP group.

S6000

Syntax

`disable`

To re-enable a disabled VRRP group, use the `no disable` command.

Command Modes

VRRP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

To enable VRRP traffic, assign an IP address to the VRRP group using the `virtual-address` command and enter `no disable`.

Related Commands

virtual-address — specifies the IP address of the virtual router.

hold-time

Specify a delay (in seconds) before a switch becomes the MASTER virtual router. By delaying the initialization of the VRRP MASTER, the new switch can stabilize its routing tables.

S6000

Syntax	`hold-time {`*`seconds`*` | centisecs `*`centisecs`*`}` To return to the default value, use the `no hold-time` command.
Parameters	

seconds	Enter the number of seconds. The range is from 0 to 65535. The default is **zero (0) seconds**.
centisecs *centisecs*	Enter the keyword `centisecs` then the number of *centisecs* in units of 25 centisecs . The range is from `0` to `65525` in units of 25 centisecs.

Defaults	**zero (0) seconds or or (0) centiseconds**
Command Modes	VRRP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Added support for centisecs on the Z9000, S6000, S4820T, S4810, and MXL.
Version 9.2(1.0)	Introduced on the Z9500.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information	If a switch is a MASTER and you change the hold timer, disable and re-enable VRRP for the new hold timer value to take effect.
Related Commands	disable — disables a VRRP group.

preempt

To preempt or become the MASTER router, permit a BACKUP router with a higher priority value.

S6000

Syntax	`preempt` To prohibit preemption, use the `no preempt` command.
Defaults	Enabled (that is, a BACKUP router can preempt the MASTER router).
Command Modes	VRRP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

priority

Specify a VRRP priority value for the VRRP group. The VRRP protocol uses this value during the MASTER election process.

S6000

Syntax	`priority` *`priority`* To return to the default value, use the `no priority` command.
Parameters	*priority* — Enter a number as the priority. Enter 255 only if the router's virtual address is the same as the interface's primary IP address (that is, the router is the OWNER). The range is from 1 to 255. The default is **100**.
Defaults	**100**

Command Modes	VRRP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.16.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

To guarantee that a VRRP group becomes MASTER, configure the VRRP group's virtual address with same IP address as the interface's primary IP address and change the priority of the VRRP group to 255.

If you set the `priority` command to 255 and the `virtual-address` is not equal to the interface's primary IP address, an error message appears.

show config

View the non-default VRRP configuration.

S6000

Syntax

```
show config [verbose]
```

Parameters

verbose	(OPTIONAL) Enter the keyword `verbose` to view all VRRP group configuration information, including defaults.

Command Modes	VRRP
Command History	This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*. The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.

Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Example

```
Dell(conf-if-vrid-4)#show con
 vrrp-group 4
  virtual-address 119.192.182.124
 !
```

show vrrp

View the VRRP groups that are active. If no VRRP groups are active, the FTOS returns `No Active VRRP group`.

S6000

Syntax `show vrrp [vrrp-id] [vrf vrf-name] [interface] [brief][ipv6]`

Parameters

vrrp-id	(OPTIONAL) Enter the Virtual Router Identifier for the VRRP group to view only that group. The range is from 1 to 255.
vrf *vrf-name*	(OPTIONAL) Enter the keyword `vrf` and then the name of the VRF to view active VRRP groups corresponding to that VRF.
interface	(OPTIONAL) Enter the following keywords and slot/port or number information: • For Port Channel interface types, enter the keywords `port-channel` then the number. The range is from 1 to 128. • For a 1-Gigabit Ethernet interface, enter the keyword `gigabitethernet` followed by the slot/port information. • For a 10-Gigabit Ethernet interface, enter the keyword `TenGigabitEthernet` then the slot/port information. • For a VLAN interface, enter the keyword `vlan` then the VLAN ID. The VLAN ID range is from 1 to 4094.
brief	(OPTIONAL) Enter the keyword `brief` to view a table of information on the VRRP groups.
ipv6	(OPTIONAL) Enter the keyword `ipv6` to view only VRRP IPv6 groups.

Command Modes

- EXEC
- EXEC Privilege

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.4.(0.0)	Added support for VRF.
Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The following describes the `show vrrp brief` command shown in the following example.

Item	Description
Interface	Lists the interface type, slot and port on which the VRRP group is configured.
Grp	Displays the VRRP group ID.
Pri	Displays the priority value assigned to the interface. If the `track` command is configured to track that interface and the interface is disabled, the cost is subtracted from the priority value assigned to the interface.
Pre	States whether preempt is enabled on the interface. • `Y` = Preempt is enabled. • `N` = Preempt is not enabled.
State	Displays the operational state of the interface by using one of the following: • NA/IF (the interface is not available). • MASTER (the interface associated with the MASTER router).

Item	Description
	• BACKUP (the interface associated with the BACKUP router).
Master addr	Displays the IP address of the MASTER router.
Virtual addr(s)	Displays the virtual IP addresses of the VRRP routers associated with the interface.

Example (Brief)

```
Dell>Interface Grp Pri Pre State Master addr Virtual addr(s)
Description-----------------------------------------------------
--------
Gi 10/37 1 100 Y Master 200.200.200.200 200.200.200.201
Gi 10/37 2 100 Y Master 200.200.200.200 200.200.200.202
200.200.200.203 Description
Gi 10/37 3 100 Y Master 1.1.1.1 1.1.1.2
Gi 10/37 4 100 Y Master 200.200.200.200 200.200.200.206
200.200.200.207 ... short desc
Gi 10/37 254 254 Y Master 200.200.200.200 200.200.200.204
200.200.200.205
Dell>
```

Usage Information

The following describes the `show vrrp` command shown in the following example.

Item	Description
GigabitEthernet 12/3...	Displays the Interface, the VRRP group ID, and the network address. If the interface is not sending VRRP packets, 0.0.0.0 appears as the network address.
State: master...	Displays the interface’s state: • Na/If (not available) • master (MASTER virtual router) • backup (BACKUP virtual router) the interface’s priority and the IP address of the MASTER.
Hold Down:...	This line displays additional VRRP configuration information: • Hold Down displays the hold down timer interval in seconds. • Preempt displays TRUE if preempt is configured and FALSE if preempt is not configured. • AdvInt displays the Advertise Interval in seconds.
Adv rcvd:...	This line displays counters for the following: • Adv rcvd displays the number of VRRP advertisements received on the interface. • Adv sent displays the number of VRRP advertisements sent on the interface.

Item	Description
	• Gratuitous ARP sent displays the number of gratuitous ARPs sent.
Virtual MAC address	Displays the virtual MAC address of the VRRP group.
Virtual IP address	Displays the virtual IP address of the VRRP router to which the interface is connected.
Authentication:...	States whether authentication is configured for the VRRP group. If it is, the authentication type and the password are listed.
Tracking states..	This line is displayed if the `track` command is configured on an interface. Below this line, the following information on the tracked interface is displayed: • Dn or Up states whether the interface is down or up. • the interface type slot/port information.

Example

```
Dell>show vrrp
------------------
GigabitEthernet 12/3, VRID: 1, Net: 10.1.1.253
State: Master, Priority: 105, Master: 10.1.1.253 (local)
Hold Down: 0 sec, Preempt: TRUE, AdvInt: 1 sec
Adv rcvd: 0, Adv sent: 1862, Gratuitous ARP sent: 0
Virtual MAC address:
  00:00:5e:00:01:01
Virtual IP address:
  10.1.1.252
Authentication: (none)
Tracking states for 1 interfaces:
  Up GigabitEthernet 12/17 priority-cost 10
------------------
GigabitEthernet 12/4, VRID: 2, Net: 10.1.2.253
State: Master, Priority: 110, Master: 10.1.2.253 (local)
Hold Down: 10 sec, Preempt: TRUE, AdvInt: 1 sec
Adv rcvd: 0, Adv sent: 1862, Gratuitous ARP sent: 0
Virtual MAC address:
  00:00:5e:00:01:02
Virtual IP address:
  10.1.2.252
Authentication: (none)
Tracking states for 2 interfaces:
  Up GigabitEthernet 2/1 priority-cost 10
  Up GigabitEthernet 12/17 priority-cost 10
Dell>
```

Example (VRRP VRF)

```
Dell#show vrrp vrf jay
------------------
fortyGigE 0/124, IPv4 VRID: 20, Version: 2, Net: 10.0.0.3
VRF: 1 jay
State: Master, Priority: 100, Master: 10.0.0.3 (local)
Hold Down: 0 sec, Preempt: TRUE, AdvInt: 1 sec
Adv rcvd: 0, Bad pkts rcvd: 0, Adv sent: 38, Gratuitous ARP
sent: 0
Virtual MAC address:
 00:00:5e:00:01:14
Virtual IP address:
 10.0.0.2
Authentication: (none)
FTOS#show vrrp vrf jay brief
Interface Group    Pri Pre State  Master addr     Virtual
addr(s)       Description
--------------------------------------------------------------
----------------------------------
Fo 0/124  IPv4 20  100 Y   Master 10.0.0.3        10.0.0.2
Dell#
```

virtual-address

Configure up to 12 IP addresses of virtual routers in the VRRP group. To start sending VRRP packets, set at least one virtual address for the VRRP group.

S6000

Syntax `virtual-address` *`ip-address1`* `[...` *`ip-address12`*`]`

To delete one or more virtual IP addresses, use the `no virtual-address` *`ip-address1`* `[...` *`ip-address12`*`]` command.

Parameters

ip-address1	Enter an IP address of the virtual router in dotted decimal format. The IP address must be on the same subnet as the interface’s primary IP address.
... ip-address12	(OPTIONAL) Enter up to 11 additional IP addresses of virtual routers in dotted decimal format. Separate the IP addresses with a space. The IP addresses must be on the same subnet as the interface’s primary IP address.

Defaults Not configured.

Command Modes VRRP

Command History This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.

Version 7.4.1.0	Introduced support for telnetting to the VRRP group IP address assigned using this command.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The VRRP group only becomes active and sends VRRP packets when a virtual IP address is configured. When you delete the virtual address, the VRRP group stops sending VRRP packets.

A system message appears after you enter or delete the `virtual-address` command.

To guarantee that a VRRP group becomes MASTER, configure the VRRP group's virtual address with the same IP address as the interface's primary IP address and change the priority of the VRRP group to 255.

You can ping the virtual addresses configured in all VRRP groups.

vrrp delay minimum

Set the delay time for VRRP initialization after an interface comes up.

S6000

Syntax

```
vrrp delay minimum seconds
```

Parameters

seconds	Enter the number of seconds for the delay for VRRP initialization after an interface becomes operational. The range is from 0 to 900 (0 indicates no delay).

Defaults

0

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Usage Information	This command applies to a single interface. When used with the `vrrp delay reload` CLI, the later timer rules the VRRP enabling. For example, if `vrrp delay reload` is 600 and the `vrrp delay minimum` is 300: • When the system reloads, VRRP waits 600 seconds (10 minutes) to bring up VRRP on all interfaces that are up and configured for VRRP. • When an interface comes up, whether as part of a system reload or an interface reload, the system waits 300 seconds (5 minutes) to bring up VRRP on that interface.
Related Command	vrrp delay reload — sets the delay time for VRRP initialization after a system reboot.

vrrp delay reload

Set the delay time for VRRP initialization after a system reboot.

S6000

Syntax `vrrp delay reload` *`seconds`*

Parameters

seconds	Enter the number of seconds for the delay. The range is from 0 to 900 (0 indicates no delay).

Defaults 0

Command Modes INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 9.0.0.0	Introduced on the Z9000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.8.0	Introduced on the S4810.

Usage Information

This command applies to all the VRRP configured interfaces on a system. When used with the `vrrp delay minimum` CLI, the later timer rules the VRRP enabling. For example, if `vrrp delay reload` is 600 and the `vrrp delay minimum` is 300:

- When the system reloads, VRRP waits 600 seconds (10 minutes) to bring up VRRP on all interfaces that are up and configured for VRRP.

- When an interface comes up, whether as part of a system reload or an interface reload, the system waits 300 seconds (5 minutes) to bring up VRRP on that interface.

Save the configuration and reload the system for the delay timers to take effect.

Related Command	vrrp delay minimum — sets the delay time for VRRP initialization after a line card reboot.

vrrp-group

Assign a VRRP ID to an interface. You can configure up to 12 VRRP groups per interface.

S6000

Syntax

```
vrrp-group vrrp-id
```

Parameters

vrrp-id	Enter a number as the group ID. The range is from 1 to 255.

Defaults

Not configured.

Command Modes

INTERFACE

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.0.2.0	Introduced on the S6000.
Version 8.3.19.0	Introduced on the S4820T.
Version 8.3.11.1	Introduced on the Z9000.
Version 8.3.7.0	Introduced on the S4810.
Version 7.6.1.0	Introduced on the S-Series.
Version 7.5.1.0	Introduced on the C-Series.
pre-Version 6.2.1.1	Introduced on the E-Series.

Usage Information

The VRRP group only becomes active and sends VRRP packets when a virtual IP address is configured. When you delete the virtual address, the VRRP group stops sending VRRP packets.

Related Command

virtual-address — assigns up to 12 virtual IP addresses per VRRP group.

version

Set VRRP protocol version for IPv4 group.

Syntax

```
version {2 | 3 | both}
```

To return to the default setting, use the `no version` command.

Parameters

2	Enter the `2` parameter to specify VRRP version 2 as defined by RFC 3768, *Virtual Router Redundancy Protocol.*
3	Enter the `2` parameter to specify VRRP version 3 as defined in RFC 5798, *Virtual Router Redundancy*.
both	Enter the `both` keyword for in-service migration from VRRP version 2 to VRRP version 3.

Defaults

2

Command Modes

VRRP

Command History

This guide is platform-specific. For command information about other platforms, refer to the relevant *Dell Networking OS Command Line Reference Guide*.

The following is a list of the Dell Networking OS version history for this command.

Version 9.5(0.0)	Introduced on the Z9000, S6000, S4820T, S4810, and MXL.

Usage Information

You can use the version `both` command to migrate from VRRPv2 to VRRPv3. When you set the VRRP protocol version to both, the switch sends only VRRPv3 advertisements but can receive either VRRPv2 or VRRPv3 packets. To migrate an IPv4 VRRP group from VRRPv2 to VRRPv3:

1. Set the switches with the lowest priority to “both”.
2. Set the switch with the highest priority to version to 3.
3. Set all the switches from both to version 3.

NOTE: Do not run VRRP version 2 and version 3 in the same group for an extended period of time.

Example

```
Dell(conf-if-te-0/0-vrid-100)#version ?
2                       VRRPv2
3                       VRRPv3
both                    Interoperable, send VRRPv3 receive
both

Dell(conf-if-te-0/0-vrid-100)#version 3
```